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VOLUME 2

IN THE SUPERIOR COURT,

State of California, County of Sacramento.

OCTOBER SESSION, 1881.

HON. JACKSON TEMPLE, - - - - - PRESIDING JUDGE.

WINFIELD J. DAVIS, OFFICIAL REPORTER.

SAMUEL OSBOURNE AND WILLIAM M. CUTTER, REPORTERS.

The People of the State of California,
vs.
The Gold Run Ditch and Mining Co. }

COUNSEL:

For Plaintiff,

HON. A. L. HART, Attorney General, GEORGE CADWALADER, ISAAC S.
BELCHER, A. L. RHODES, RICHARD BAYNE.

For Defendant,

J. K. BYRNE, W. C. BELCHER, S. M. WILSON, W. T. WALLACE, A. B.
DIBBLE, A. P. CATLIN.

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In the Superior Court
of the State of California
in and for the County of
Sacramento

The People of the State
of California
vs.
The Gold Run Ditch
and Mining Company

} Saturday
Dec. 3rd / 81

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3430

Winfield J. Davis
Official Reporter

In the Superior Court
of the State of California
in and for the County of
Sacramento

Morning Session

Saturday Dec. 3rd 1881

Testimony
of

G. F. Allardt

resumed

Mr. Cadwalader. Will you please
look at this which I will call
Robinson sample No. 1. Just
mark that Robinson sample
No. 1, that the Robinson sample
No. 2, and that the Robinson
sample No. 3. We will have the
Clerk put these in bottles hereafter.
What would you take that Robinson
sample No. 1 to be with reference
to what you saw at Good Run
when you were there.

Mr. W. C. Belcher. We will interpret

an objection here. If this witness has gathered samples there we want to know where the samples came from and what they are. But that sample should be brought in here by counsel and submitted to the examination of counsel for the purpose of having him testify as an expert comes be entirely unfair. At any rate we are unwilling such testimony should be given here. If this witness has gathered samples and brought them in here that is another thing.

Mr. Cadwalader. I will put the witness on the stand who gathered them if you desire it. But this is merely for the purpose of general identification.

Mr. W. C. Belcher. We prefer that this witness should identify what he himself knows about.

Mr. Cadwalader. You evidently do not understand me. I

want to ask the witness whether he saw Earth like that at or near the Solo Run mine

The Court. I do not know that there would be any objection to asking him if he recognizes the Earth or has seen it or not

Mr. Cadwalader. It is not for the purpose of special identification but for general identification.

Just answer whether you saw any such earth

The Court. That is rather a leading question. State if you know anything about these samples

Mr. Cadwalader. That kind of Earth

A. I know nothing about it except that I ~~saw~~ it here now I do not know where it came from. The sample marked Robinson sample No 1 appears to be a red dirt and similar to the red soil found in that region of country on Cox, the Cox

Soil.

Q. Now in regard to the top soil of Gold Run?

A. It is all the same in all that neighborhood. It is a little darker when it is in the bank and wet.

Q. State whether in the bank it would show more or less of the red color than it does there?

A. In large masses it will show more of a reddish color than in small quantities, and if it is a little moist it will still be darker, and it generally is moist when it is in the banks.

Q. Is that called the red Earth of the mine?

Mr. W. C. Belcher. We object to that question as leading Mr. Cadwalader. Now take Sample No. 2.

A. I will take some water and moisten it (does so). This is to show that when it is moist it is of a more

reddish color
 Mr. W. C. Belcher. Which sample
 is that?

A. That is the first sample, the
 red soil. I have simply overt
 it which gives ^{it} more the natural
 appearance, the banks being
 most generally

Mr. Cadwalader. At Goose Run
 how thick is the strata of
 that red earth where the bank
 is?

A. It varies in
 thickness I think from four to
 ten feet perhaps on an aver-
 age

Q. How is that in regard to
 the material out of which comes
 the pines and other timber?

A. I think it is the productive
 soil from which all ~~soil~~
 growth comes, the top soil.

You see it all ^{over} of the moun-
 tains in that region of country

Q. Now take the next sample
 those Robinson sample No 2
 and state whether you have
 seen that at Goose Run
 or something like it and of so

When and where?

A. This has the appearance of the gravel deposits in the bank of the mine

Q. Of what mine?

A. Of the Gold Run mine for one, and many other mines. It is composed of small stone and sand, material that comes ^{under} Crumble with the fuzes, and there is some clay in it.

{ Moistens it } When it is moistened it becomes tenacious, sticky & like putty, indicating clay. Q. Now take Robinson sample No 3, state what that is in the first place?

A. That has the appearance of pipe clay. It is more yellow than you generally find it, though pipe clay is of different colors. I see when it is broken it shows white inside. There is very little sand in it. It is easily trituated, and when it is trituated with water it has the appearance of what we commonly term shekens.

In its dry state it is quite hard. It contains a good deal of coloring matter.

Q. Did you see any of that pipe clay at that Goose Run mine?

A. I saw layers of pipe clay in that mine quite heavy layers of pipe clay. They appear whiter than that, as exposed to the surface, that I saw; whiter than this does on the outside.

Q. Will you take that tube behind you in your hand.

That is now settled is it not?

A. Yes. That has stood now - about six ten hours.

Q. That you estimate to contain 18 per cent?

A. Yes: just about as it stands now.

Q. Would that 18 per cent be the volume by way in a river channel? would that be the volume, deposited ~~by~~ of water of that kind in a running channel?

A. In a running channel it would not probably

Settles or compactly as in this
still tube. As there is always
motion in water very probably
it would occupy more space
in a running channel or in
any moving water than it does
in this tube. At all events
it does not occupy so much
here

Q What I want to get at is it would not be less would it? A No: it would occupy more of anything

Q That is what is called the wet process is it not?

Mr Becher We object to this style of examination as improper

Mr Cadwalader That was simply the predicate to another question

Mr Becher You have too many predicates

The Court It is easy to ask him what the process was called

Mr Cadwalader That is assuming that the gentleman on the other side knows what I am going to ask

The Court No it is assuming only that the witness ought to know what the process is called

Mr Cadwalader But I am going to ask him a question to which that is

merely a predicate I say now, that being the wet process of estimating the volume of that material, what would be the dry?

As the dry process consists in evaporating the water in an evaporating dish or similar apparatus and weighing the material when it is perfectly dry and then making the necessary computations as to its percentage

Q What would you call the two processes of estimation?

A I think the wet and the dry process would perhaps be the most intelligible appellation

Mr Belcher. That is simply for designation?

A For designation. To designate the process so it could be understood by what process the analysis was made

Mr. Badwalader What would be the difference, if you took the bulk of that dry, as compared with the quantity of water, and the bulk of it wet as compared with the quantity of water?

A I am not prepared to say. It would be better to actually perform the operation - that is to evaporate it - which could be easily done

Q Can you give us a general idea?

A About two thirds. It would occupy about two thirds of the bulk that it does now. I should judge that is an estimate of mine

Q Is there any other process that is sometimes used in ascertaining the bulk of material as compared with the bulk of water? If so what is that?

A I know of no other process. Any river where the dry material after it is evaporated is sometimes pressed into certain forms, regular forms, that is cubes, in order to ascertain its specific gravity.

Q I will ask you if you made that <showing water a paper> and what it purports to be and to illustrate?

A This is a sketch an ideal sketch or profile of a portion of the Gold Run Mine, made to illustrate a certain proposition.

Q What does that illustrate? I would like to ask you. I know a question: have you ever been to any of these hydraulic mines?

The Court I have I believe Mr. Badwalade. What ones?
— The Cherokee flat and some others.

Mr. Badwalade You mean

the Cherokee flat mine?

The Court The Spring Valley,
the Hendricks and several
others

Mr Badwalader I have you
understand about mining
and it is unnecessary to go
into that

The Court I have seen all
kinds of mining in my life
I believe

Mr Badwalader When you
were at the Gold Run Mine
did you hear any explosions?

A I did

O General Start requests
that the Witness explain
that little diagram which
he made and state what it
is? Just explain that

A This represents as I
stated an 'ideal cross section
of the Gold Run Mine,
showing the present lower pit,
the lowest pit, and the
former level of the old workings
of the original surface. The
bed rock is pitching towards

The hill side, towards the original surface on the railroad side and is seen in the mine. Now the proposition is that they are washing the banks below the line A.B. — that is the old original surface claim and if they continue to wash in the direction towards C, the consequence necessarily ^{will} be that there will be a slide; that is that the original surface in time will slide down into the mine in great mass; and that, if they continue working the mine, must of necessity be also swept out of the mine into the river. Although it may not be the intention of working the upper strata that will be the inevitable result.

Q I will ask you whether you observed any derricks in the defendants mine?

A There are no derricks there.

Q Did you observe any refuse of any kind? A It may be said that the mine is quite clear of any refuse or moveable material such as we find in a great many other mines

Q What do you mean by that? That it has all gone through the tunnel?

A It has all disappeared, all gone through that tunnel

Mr Belcher We object to these leading questions

Mr Leadwala Q Did you say you saw any refuse matter? A In this mine?

Q Yes.

A I said I saw none, none of any moment

Q You have stated where all the matter had gone?

A All the matter has gone through that tunnel that is from the lower workings; from the upper workings it has gone through the upper cuts

Q fine is the quantity of earth that that mine would discharge in a year at the rate you estimated it to be depositing in the American river when you were there? A I think I said that they were piling or washing at the rate of 13000 cubic yards a day. That would amount for 365 days to 4,745,000 cubic yards

Q Take it the way the contestant makes it in this case in his answer, at five months in the year and 16 hours per day

A It would be in ^{the same} proportion as 288 is to 80. I will make the computation in a moment. In round number 1,318,000 cubic yards

Q A year? A A year

Q Into the American?

A Into the American

Q What is the discharge in gallons per acre of say 1000 inches of water?

Q About 16,000,000 gallons

Q That is the per diem discharged. A Yes Sir of 24 hours

Q At what velocity was the ~~tank~~ of this mining travelling through the tunnel?

A I estimate about 8 miles per hour, ^{where} were —

Q What is the bottom of that tunnel used for?

A The bottom of the tunnel is lined with railroad iron, they are generally lined with blocks, where I saw it was railroad iron. It was used to collect the gold, to catch the gold as it passes down. It is made rough purposely.

Q At what velocity was that travelling? A About 8 miles an hour.

Q What was the largest matter that was being transported in that flume by that velocity that you saw there? A The water,

was so thick we could not see but we could hear stones rolling along the bottom, I could not see how large ^{they} ~~it~~ ~~was~~ ^{were}.

Q Could you see stones in the bank that were being washed down? A I could see stones just below where it had dropped over into Canon Creek, small cobbles I think I recollect that they were. I have seen ~~an~~ in other flumes some very large cobbles and I know the transporting power of these flumes, cobbles as large as a child's head.

Q After entering the North fork what would be the rate of transportation of the material that the water held in suspension? A Down the river?

Q Yes sir

A The material held in suspension would necessarily travel as fast as the current

Now the average velocity of the current from Cañon Creek down to say the junction of the North fork 28 miles is about 3 miles an hour — $28\frac{1}{2}$ miles, that would take $9\frac{1}{2}$ hours to get to the junction of the North fork. Shall I pursue is further.

Q Yes sir clear down to the Sacramento

A I will have to generalize in this matter as to currents. Between the middle fork and Dawson I estimate the current to be less, say 2 miles an hour from my observation at different points say 2 miles an hour that is a distance of ²⁰20 miles, so it would require ¹⁰10 hours to go from the middle fork to the junction of the South fork and from the junction of the South fork to the mouth of the ^{American} ~~Sacramento~~ river is 34 miles. There I think the current will not

average over 1 ~~mile~~ mile per hour
 There are places I found
 it run faster and some
 slower, you may call it 1
 mile per hour. That would
 take 34 hours making a
 total of 53 hours - say
 something over 48 hours.

Q The material that starts
 at Canon Creek in Spanish
 Run would reach Sacramento
 in a little over 48 hours?

A In my judgment

Q Would that include or
 exclude anything flowing
 along the bottom of the river -
 sand flowing along the bottom
 of the river?

A The sand will not travel
 so fast, it is impossible ^{to say}

I ~~to~~ estimate only that
 held in ~~relation~~ suspension
 freely flowing, flowable
 material

Q I asked you before you
 went to Gold Run in June
 you did examine the water
 of the American river

as it entered the Sacramento?
 A I did

Q How many days before
 you got to Gold Run?

A I was at the mouth
 of the American River on June 15th
 of this year. I went up
 in a boat, and the sample
 of water taken at the mouth
 of the Gold Run tunnel
 was taken June 18th — 3
 days

Q What was the condition
 of the water in the American
 river entering the Sacramento?

A It ^{was} extremely muddy
 and had the appearance of
 all these rivers carrying
 mining debris, boiling up
 and forming waves, though
 it was low water, surging
 along so to speak not
 running very smoothly, sand
 bars forming in the bottom
 and being carried away

Q What is the color?

A The color was yellowish
 I think, muddy, mud color

Q Did you follow the American river up any distance from the mouth? A A little distance from its mouth and then the next day from the railroad bridge I followed the same down some way but not the entire distance at that time.

Q How did it compare with the water that you had seen the day before at the mouth?

A I could see no difference in one day.

Q Does a solid immersed in water lose any of its weight and become more easily transported?

The Court I suppose it is not necessary to prove that

Mr. Leadwelder Then I will ask you how much the specific gravity of ordinary rocks will lose when they are immersed in water?

A They lose the weight of the water they displace, all bodies lose the weight of the

water that they displace, the weight of the volume of water that they displace. For instance a cubic foot of stone immersed in water will weigh $62\frac{1}{2}$ pounds less than it did in the air, $62\frac{1}{2}$ pounds being the weight of a cubic foot of water.

Q <To the Court> Does Your Honor say that it is unnecessary to prove whether that would help or hinder transportation?

The Court I suppose there are certain facts like that you can prove from the books if you want to. I do not think it is necessary. I suppose everybody knows that general proposition. If you want to prove that large stones would be transported with a particular velocity you can do so.

Mr. Caldwell. I will ask you if you know what is called the state of stability of a river with sand beds

and bottoms — say coarse sand? Q A state of stability of any river is when the current does not erode, leaves the bottom or bed of the river in a state of stability

Q Now take sand, coarse sand? A As soon as the velocity of the current is sufficient to move this coarse sand the stability or régime of the river has been destroyed and of course it erodes or carries the sand along

Q Well what puts it in motion, what kind of current produces this erosion of which you speak?

A There are tables on that subject based upon experiments made by scientific ^{men} people which are generally adopted as controlling by engineers who cannot make experiments themselves. I have a set of tables

Q Just refer

Mr Belcher I prefer that he would not refer to the tables we can read those ourselves.

Mr Cadwallader Will you now answer my question as to what current would produce an erosion in a river with a sandy bottom?

A I do not carry those figures in my head; I always refer to the table

Q I have you the tables?

A I have the tables

Q Just refer.

Mr Belcher I make the same objection.

Mr Cadwallader What tables have you there ^{Dr. Buat's}

A I have Dubois's tables

Q Is that the accepted authority among hydraulic engineers?

A It is accepted amongst the hydraulic engineers and it has been copied in all the books as being authority on that subject

Q In what book

A I have seen it referred to in most books, all engineering books and amongst others Humphrey, Abbotts Exploration of the Mississippi River and Le Conte's Geology and Trautwein's Rivers Engineering and Rankine.

Q. Are they received authorities in your profession?

A. They are text books in the profession.

Q. Have your observations embraced a verification of any of those tables?

A. Yes sir not every part of the table, the table starts from fine clay to heavy rock

I verified in a number of instances by observation that the tables were properly correct. I could not make the experiment myself I was satisfied that the tables were as near correct as they could be given;

Q. I just want to identify this one thing, the movement of coarse sand, just state what that is?

A. A current of one mile an hour

Will move sand, two miles an hour will move coarse sand that is my recollection, two miles an hour would move coarse sand along the bottom of a river, I speak from memory.

Q What is the effect say of trebling the Current upon the movement of heavy bodies?

A. That follows a natural law

Q Supposing the Current at one mile an hour moves stone of a given weight, how much of an object will a current of three miles an hour move?

A. The transporting power of the Current varies as the sixth power of the Velocity; that is to say if a Current one mile an hour will just move a certain class of material or a certain weight, ~~a certain~~, a stone of a certain weight, then a current three times as great, three miles an hour will move a stone weighing seven hundred and twenty nine times as much, 729 being the sixth power of three, the sixth power

Of one is one, Every power of one is one, The sixth power of three is 729,

Q-Suppose you take it in this way, say you take a cubic inch of stone which is moved by the water at a certain velocity, Suppose the velocity of that water is doubled what kind of stone will that move?

A. It will move a stone containing sixty four cubic inches that is a stone weighing 64 times as much, there are other elements in the matter if the stone is round it will move with greater velocity than if the stone is square, but this is supposing this ^{to be} a square stone

Suppose the velocity is increased ten times, how much is the transporting power increased,

A. It is increased ^{to} from the sixth power ~~to~~ ^{of} the tenth ~~th~~,

One million times.

Q Suppose you take a current two miles an hour how much would that be per second
A That would be about three feet per second.

Q Now when you increase that to ten miles per hour what amount of material would that remove

Mr W C Belche He has just told you the proportion?

A A current of two miles an hour will move pebbles, small pebbles, I have seen that

myself, it will roll them along at the bottom, perhaps pebbles an inch in diameter, Now a pebble an inch in diameter will weigh perhaps an ounce — you said two miles an hour and ten miles an hour did you not

I Yes sir a. well, the
Sixth power of 2 is 64 the
Sixth power of ten is 1,000,000
and the transporting power
of the ten mile currents will
vary as 64 is to 1,000,000 -
15,625 in round numbers.

15,625 times as great ^{the} transpor-
ting power of a ten mile cur-
rent is 15,625 times as great
as the transporting power
of a 2 mile current

Q Now - I will ask you this
question. When the current
gets to moving at the rate
of 2.0 miles an hour is it
not practically irresistible

Objection to as leading
Mr. Cadwalader. What is
the effect in checking the
current of a sediment bearing
stream as the sediment carried
in suspension

Q. When the velocity of any
sediment bearing current is
checked it immediately drops
some of its material. It
follows from that same

law.
 look.

1. Suppose the current is subsequently accelerated in any degree what will the water then do upon the sediment that it had previously dropped? a. When the current is accelerated it will immediately pick up the material that it had dropped when it decreased, and carry it further on and continue to carry it as long as that current maintains that same velocity?

2. Is that irrespective of the degree of increase?

a. No. It increases as before stated, the transporting power increases very rapidly.

2. But what if you have a current that has been checked enough to cause it to drop its sedimentary matter if it is subsequently accelerated in any degree whether or not it will pick up and carry off that same matter?

A. Undoubtedly

Q. I will ask you how a solid matter composed of different materials will arrange itself when thrown into still water?

A. Loose material?

Q. Yes sir, of different kinds?

A. That is easily demonstrated of course, if it become stratified the heavier material drops to the bottom first; the next heavier on top and after that the lightest on top. It takes the form of stratification.

Q. Now that running water where the current is variable what would be nature of the deposit made by that running water?

A. Currents of all rivers are variable, they change every moment you might say more or less, they change with the seasons. A moderate current will carry the material forward and on that velocity & checked

it will deposit it, the heavy material being deposited further up the stream. Now if the current is increased the heavier material from above will be deposited on the lighter material below. Then comes again the lighter material, that makes stratification. You see the light material and then the heavy material, and then again a lighter material and so on. In that way I understand the stratification is formed in river bottoms.

2. In running water?

A. In running water.

2. Where the current varies with the seasons?

A. Yes sir.

2. Can you state whether or not all sedimentary deposits are not stratified?

A. They are necessarily stratified, as sedimentary deposits are known to be deposits caused by the action of water.

2. What would be the

Natural movement of such material as can deposit from Canon Creek down the stream and into the Sacramento. Describe the methods of travel and about the rates of travel — I do not mean down into the Sacramento, but down toward the Sacramento.

As the lighter material, as I said before that is held in suspension will probably be carried mostly to the Sacramento River.

I. At any stage of the water? A. At a low stage of the water. In a great many cases it will be deposited in eddies and sheltered places ~~and~~ ^{to} spread more or less but the bulk of it I think goes into the Sacramento River. Then comes the lighter sand which comes down a little later, and so on, the heavier material. If for coasts I think there is no question that

the whole material, the heaviest material is moved down the stream during the continuance of the freshet. I have found for instance on this examination of the river that the heaviest material seemed to cease at about a distance of forty miles below the Lees Run Mine, that is in the vicinity of Horse-Shoe Bar and Rattlesnake Bar and so on.

Q What would be the consequence if the water that corrupted or fouled the American river at Canton Creek did not come down stream?

A. We would have clear water.

Q We would have clear water below it?

A Not immediately. For instance the water now although there is no mining going on is slightly turbid. I think it would require a good strong freshet to scour the mud out and after that I think

We would have good clean water - to scum the light mud out which is distributed all the way ^{down} ~~up~~ stream, then I think you would see that the water would run on a gravelly bed and be clear.

2. That is not what I asked you exactly, that is not the explanation I wanted. I say what would be the unfailing consequence if the stuff that corrupted the water in the American River from the mouth of Canon Creek did not come down the stream

The Court. If it was put in the stream and did not come down.

A. It would be deposited right there. It would be dropped right there and it would be visible.

Mr. Cadwalader. Well that is not what I asked. What would be the character of the water.

465 Mr. Webster. He said

that it would be clear
 Mr Cadwalader. I did not
 hear that. You states I be-
 lieve that you estimated the
 current in the tunnel did you
 not at eight miles an hour?

A Yes sir.

I would, or would not the
 same current in the river move
 that stuff down stream through
 the river bed?

A Undoubtedly the American
 River in its present condition
 is a very smooth river like a
 canal, as I stated like a
 gigantic flume you might say.
 with an even grade and if
 an equal current ^{prevails} in
 the river it undoubtedly
 would do the same work that
 an equal current does in a
 flume. A flume is rough on
 the sides and on the bottom
 and steel carries this mate-
 rial and during the prevalence
 of a flood which would pro-
 duce a velocity of 8 or 10
 miles an hour, I think it is

a natural law that the material would wash down with equal rapidity in the river as in a flume

2. Are or are not these flumes constructed with rough bottoms?
 A. They are purposely so constructed with blocks or iron rails, generally blocks, sometimes cobbles, in the Odder mines cobbles have been used to a ^{great} ~~some~~ extent, I do not know but what they are now. The object is to make the bottom as rough as convenient if possible

2. Did you find any obstacles to the flow of the stuff down stream in the North Fork from Cañon Creek down to the mouth?

A. I saw the river from Cañon Creek down to the mouth, and there was no obstacle except if we may call the North Fork dam an obstacle. This dam is a newly erected dam, constructed by the North Fork Ditch Co. apparently about 30

miles below the Gold Run mine, but when I saw the dam the water was running freely through it without any obstruction, not running over it but running through it, that is not an obstruction, it was running through the west gate. The dam had not been completed but when it is completed it will run its waters into the canal and the balance of the water will flow over the top like all these diverting dams.

Q. What would be a limit to the arresting capacity of that dam, suppose there were no breaks in it?

A. It backs the water up about a half a mile and the dam is 200 feet long and I estimated that about 200,000 yards would fill the dam, if it is emptied now, about 200,000 yards of debris would fill the dam to the top. Then it would present no obstacle, that

The muddy water and all the water would flow over the top all through. The same is true in the Yuba dam and the Bear River dam and the San Juan Ditch and a number of dams which I have seen.

The dams are merely built to raise the river beds and divert the water into a ditch, and it makes no difference whether they are filled up for that purpose - It answers the purpose of diverting the water into a ditch. I suppose any freshet would fill it up in a day or two. That is the only obstacle on the way down to the mouth of the American River.

2 You say that you found a precollet, at least one place where there was no deposit at all, that is between Canon Creek and the mouth of the Middle Fork. a. Lessor,
I mentioned some three miles

When the face of the river is greater and the Cañon or ghyll is swept quite clean. It is proper to say there is no deposit there. That is below Rices Bridge.

L. That you say is a three mile section of the river. Is the bed-rock there apparent?

x A. ~~Man.~~ Yes.

L. Now what do you have to say upon the quantity of the sand that is in motion along the bed of the river as compared with the quantity of material as is carried in suspension by the water, what are the relative proportions of that matter, if you have been able to arrive at them?

A The question is as to a comparison between what is rolled along the bottom and what is carried in suspension. I have stated what is carried in suspension, but I am not able to form an opinion what would be carried at the

bottom. That varies so materially with different currents. Probably at the present time between Golson and Sacramento there is very little sand carried in the bottom while during a freshet the amount would be very large indeed. I would not make any estimate on that except to say that during the freshet it is very large necessarily.

I suppose that the bottom is sandy - I have stated what the rate of erosion would be, that is it commences after the current is one mile an hour I believe Mr Belcher. He states that light sand would move at one mile an hour.

Mr. Cadwalader. Did you form an opinion or an estimate as to the velocity of the water in the Cañon at its high stage, at its average highest stage.

A. Yes Sir based upon observation, for instance I would measure, I did measure the velocity of the current at an even reach of the river and found it to be about 3 miles an hour.

The Court. In the canon?

A Not in the canon but in the river, an open reach of the river. Say half way between Canon Creek and the mouth of the Moose Fork in that vicinity.

Mr. Hart. That was at low water?

A At low water I measured at several places so as to fix a standard to the eye by which I could determine whether the velocity of the water had a greater or lesser rate in different places. Well, I will say 3 miles an hour. The water average a foot deep. The depth was ascertained by going with horses and finding how deep it went up on the horses legs. Measuring the horses legs it went up to the knee joint. The measurement was very satisfactory. An day it was a foot deep, and the velocity 3 miles an hour. Now the

high water marks that were visible all along the river in a good many places showed a height of 20 or perhaps 25 feet for freshets or high water; say 20 feet. With this data at our disposal it is a very simple matter to compute what would be the velocity of the river at this point when it is 20 feet deep. According to a natural law, another law of hydraulics, it varies as the square root of the depth. There are some smaller elements that enter into it but in a rough way you may say, it varies as the square root of the depth. Therefore if the velocity was 3 miles an hour at that point, and the depth of the water is increased 20 feet, the velocity will be $4\frac{1}{2}$ times as great. $4\frac{1}{2}$ times 3 miles an hour, would be $13\frac{1}{2}$ miles an hour. That would be an extreme velocity.

Mr W. C. Belcher. The witness

give the same figures before
Cashly

A. I believe I did give the
same figures yesterday

Mr. Cadwalader. Some of the
witnesses here have spoken of
abnormal rises in that river
of 40 feet. What would be
current of that river at a
40 foot stage?

A. At this same point.

Q. At this same point.

Mr. W. C. Belcher. There is
not any witness that testified
to there being any forty foot
rise at this point.

Mr. Cadwalader. Yes. Mr.
Gwynn did

Mr. W. C. Belcher. Not at this
point.

Mr. Cadwalader. At Rattlesnake
Witness. The velocity would
be increased in the proportion
of the square root of 40,
which is 6.4. The velocity
therefore would be 19.2 miles
per hour

Q. Did you estimate the an

mount of deposit or debris from
the mouth of Middle Fork down
to about Folsom

Mr. W.C. Belcher. He went
through that yesterday too.
From the Middle Fork he
said that he assumed the
same ratio as above where
you made the section of
miles. He said it was $9\frac{1}{2}$
miles, that he made it in
mile sections. Below that
assuming the same ratio he
then made an estimate of
9 million and odd hundred
thousands as the deposit be-
low, for the next section,
making it all $28\frac{1}{2}$ miles
including the $9\frac{1}{2}$.

The Court. Did you estimate
below that point?

A Not yesterday - no
The Court. Go on. I remember
the same calculation you allude
to, but I do not know
whether it was below that
point

Mr. W.C. Belcher It was below

that point. He has it a certain number of millions above and a certain number of millions below.

The Court. I do not remember whether it was above or below
Witness. Shall I explain that
The Court. If you have not given it below that point, go on and give it
Witness. I have not given it
Mr. W. C. Belcher. I understand you to say that you did not make any statement yesterday as to below that point

A No figure. I gave no figures

Mr. W. C. Belcher. What point do you ask him about, Mr. Cadwalader?

Mr. Cadwalader. I am now asking him from the mouth of the Middle Fork down the Cañon to Folsom

A. I suspected the river all the way down and took an account of the appearance of the river as to

the amount of sediment in it
and subsequently made a
calculation

Mr. W. C. Belcher. I wish you
would leave your figures for
the present

A. Leave my figures?

Mr. W. C. Belcher. Yes. I mean
what you have written on
your paper

Witness Yes? I have made
no use of them yet.

Mr. Cadwalader. Are they all
on that map? A. No sir.
I made a calculation of the
amount of debris still lodged
in the river between the Middle
Fork and Folsom.

Q. What point in Folsom?

A. Say right at the bridge

Q. At the mouth of the
Canyon

Mr. W. C. Belcher. The bridge
he says

Witness. It is unnatural,
you can say at the junction
of the South Fork, because
there was no debris below

there is the Great Rocky Canon.
 between there and Tolson.
 You may say to the South
 Fork, the junction of the
 South Fork. That is a distance
 of say, twenty miles. I
 estimated that. There was half
 as much debris in this 20
 miles, half the amount of
 deposit, half the ratio, as
 there was in the 28 miles
 above.

I will now state that in
 detail either going up or
 coming down and state your
 manner of arriving at it
 and the appearance of each
 section of the river as you
 have laid it off on the map?

A. From the junction of the
 Middle Fork down to Lacey's
 Bar there was very little
 deposit in the river in my
 opinion.

Q. What was the character
 of the river bed, and banks?

A. It showed water - worn
 water frequently.

Q. What was the nature of the deposit?

A. It was mining debris. There was not much in that.

Q. Composed of what?

A. Composed of sand, small stones and gravel.

Q. Cobbles? A. Some cob. bls, yes; a few.

Q. Which now take the next section from Lacy's Bar?

A. At those bars - Lacy's Bar, Rattlesnake Bar, Horse Shoe Bar and Dotens Bar - there was more or less deposit in the river. I have it marked here.

Mr. W. C. Deleher. Let us have the section that you are giving first, the counsel asked you the section.

A. I give them following down stream: Lacy's Bar, Rattlesnake Bar, Horse Shoe Bar and Dotens Bar. I do not pretend to give this in detail. As I stated before I did not make a very careful examination of that river as to the quantity

of material. I do not pretend and do not wish to be understood that my estimate is even approximate. I merely state that from my observation there is less deposits in that reach between the Middle Fork and the South Fork that there is between Canon Creek and the Middle Fork. My main object was to ascertain on that reach of the river, at least, whether there were any obstructions to the flow of the water.

2. What is the character of the next section from Laeys Bar down to the next station? How does the river run, what are its banks and what is its depth?

Mr W. C. Delebe. I make this objection: That this witness according to his own testimony states that his examination is not even sufficient to base or to make his estimate even approximate. Hence his testimony would be incompetent for any useful

purpose in the case
The Court. It is certainly of
 very little value

Mr. Cadwalader. The question
 I asked is the character of the
 river and of the river bed from
 Laeys Bar down to the next
 station

The Court. Well, what is the
 character of the river bed there

A From Laeys Bar to Rattlesnake
 Bar, or Rattlesnake
 Bridge, the river was compa-
 ratively clear of sediment.

Q. What do you mean by
 comparatively clear?

A There was not much in it

Q What do you mean by not
 much?

A. Well, I
 would say if there was only
 one or two feet in it there
 would be not much

Q Did you make your obser-
 vations close enough to state
 that?

A. I saw it and
 observed it closely. That
 is all I can say. I saw
 the entire river.

2. Is there something more than an approximation as to the condition of that part of the river?

a. It certainly is. It certainly is in this respect: in comparing it with the upper reaches of the river which I have measured I can say I think with certainty, that there was either more or less debris in that part of the river taking the river as a whole.

2 Now take the next section. What was its bed and banks and the character and extent of the fill in the river? a. Between Rattlesnake Bar and Dotter Bar it is all full - No, I estimated that between Rattlesnake Bar and Horse-shoe Bar just. I estimate that between Rattlesnake Bar and Horse-shoe Bar the debris was eight feet deep and between Horse shoe

Bar and Roller Bar 4 feet deep

2. How wide?

A 200 feet is the average width marked on the map. I measured the length of the Rattlesnake Bridge, 100 feet between towers. To be exact I will have to refer to my notes on that point.

2. Just refer to your notes

A I believe it was a little more than that. I measured all the bridges that I came to. (Examining notes). 200 feet between the towers; Rattlesnake Bar bridge is 280 feet long between the towers. The towers rest on abutments on the side of the banks. The bottom of the river there is about 150 feet wide. The floor of the bridge was 47 feet above the bed of the river. I measured that.

2. What is the character of the material in the river bed?

A. There was

Some mining debris there and for some distance out as I stated

Q. What was the mining debris composed of?

A. It had the appearance of that above: gravel, sand and small stones. It all looked alike all the way up there.

Q. How as to cobbles?

A. Cobbles begin to become less frequent at about that point. That is, below Horse Shoe Bar, I think that the heavy material ceased in a measure; after that it was finer material visible.

Q. Now go right on down to the mouth of Sanich Fork and state whether you personally observed that section of the river?

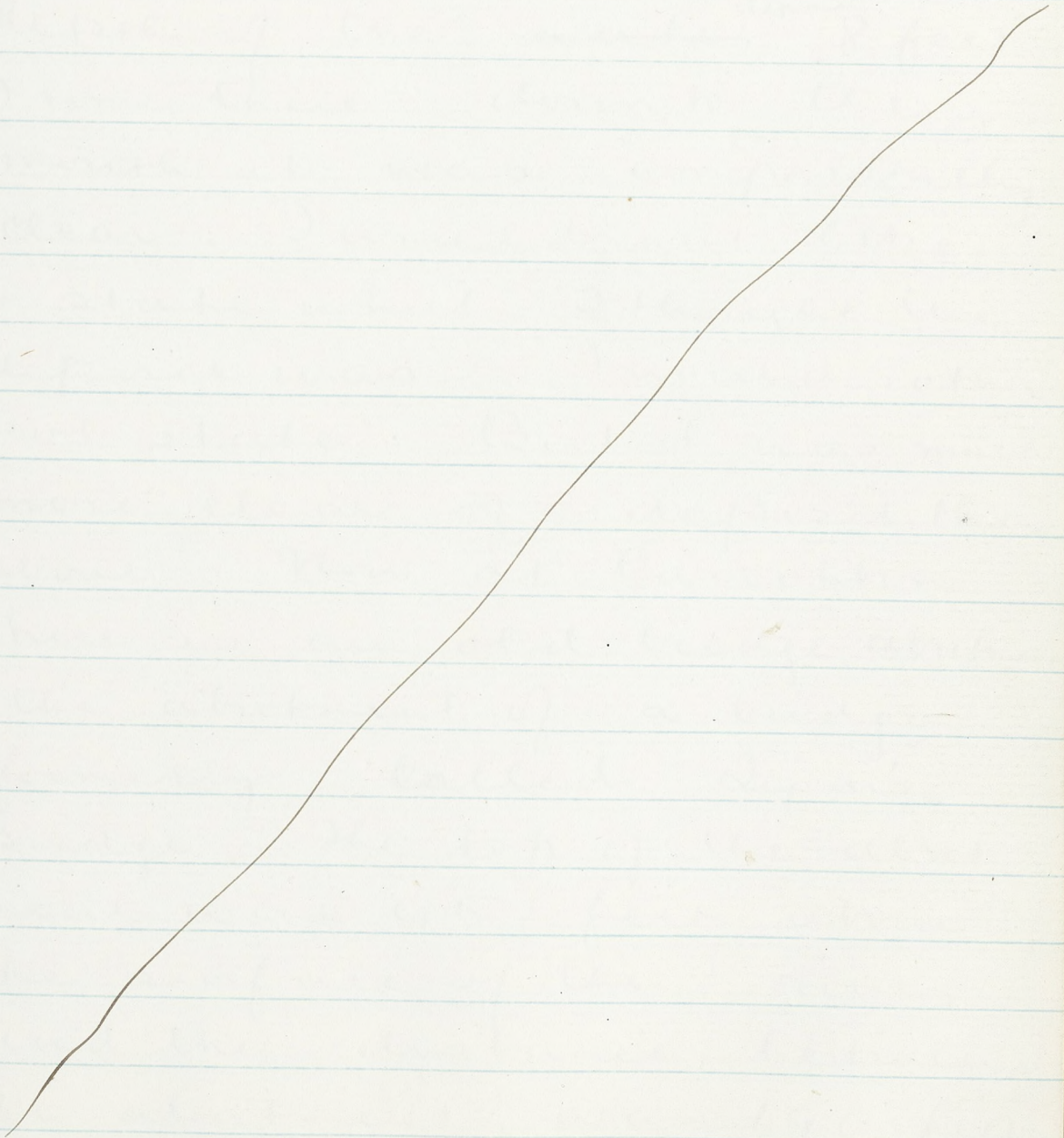
A. I did. I saw the whole river

Q. Where did you travel in regard to it?

A. That section I travel on the road on the north bank not in the river, and partly upon the

North Fork ditch. I can not
 always close to the river but
 in such position that I could
 see the river from point
 to point and I made it a
 point to go to the river
 and see it

2 Now describe the char-
 acter and depth of the
 deposit as you estimated
 it?



Mr Belcher What is this place? From Doton's to where?

At Doton's Bar to Carrollton No! from Doton's bar to the 43 mile station Doton's bar is at the 41 mile station and in these two miles - that is from the 41 to the 43 mile station the river was about 100 feet wide and the estimated depth of the ~~water~~^{deposit} 8 feet from there down to the mouth it was comparatively clear. I would not like to state what I thought the deposit was; I would rather not state. But it was much more clear of deposit than above. Now at Carrollton there is an old bridge abutment - the abutment of a bridge formerly called Ayer's Bridge. The top of the abutment was 45 feet above the surface of the river and the distance between the abutment was 190 feet

It was interesting in this respect perhaps, as showing or giving an idea of the high water mark of the river. We find the bridges, particularly expensive bridges, where stone abutments are used are seldom built any higher than necessary, generally not built as high as necessary. So if we see a bridge that is built 45 feet above the water we may assume I think with a considerable degree of certainty that high water mark will very nearly reach the top, allowing perhaps 8 to 10 feet for drift wood and so on. That bridge was not swept away however. It was carried away, was transported further up by Lyons, as I was informed for other reasons. at the junction of the North fork or main river as it is now, and the South fork

near Beale's bar I find
a large bar which I estimated
at 15000 cubic yards: sand
gravel, small stones; a
great deal of sand, Below
that to Folsom the river
is swept pretty clean

Q What do you mean by
"pretty clean"?

A Well I say entirely clean.
I mean entirely clean. Of
course there a few cart loads
here and there. But it is
clean, clean of debris,
^{it is} ~~and~~ in its original condition
cascades, rapids. In speaking of such
large masses you have to
speak in general terms.
I can^{not} ~~not~~ speak of a little
deposit here and there,
but in a general way. Then
from the Folsom Bridge
below to Sacramento is a
deposit probably all the
way, I think the river is
filled up. I know it is
filled up all the way
from Folsom to Sacramento

more or less with finer material than that which I saw above.

Q Taking the ~~extent~~^{depth} of material at 10 feet and the width of the river at 400 feet from Tolson down, what would be the amount of fill?

Mr Belcher That is a matter of simple mathematical calculation which I think the Court itself can make.

The Court It will not hurt any for the witness to answer if he has the answer ready.

The Witness It will take but a moment.

Mr Belcher Then I make the further objection that the hypothesis which the Counsel assumes is such as to be of no value at all, because it is not proven that this river has an average breadth or that the filling has an average depth.

The Court It probably depends upon the value of the testimony, and I suppose I could hardly estimate or give the value of the testimony now. I will have to let it come in.

The Witness The distance from Folsom down to Sacramento by river is approximately 30 miles. If the river be an average of 400 feet wide and the sediment 10 feet deep, in all that distance it will amount to 23,466,000 cubic yards - between 23,000,000 and 24,000,000 cubic yards.

Mr Badwalader Q Did you inspect that section of the river from the mouth of the American to the mouth of the Cañon at Folsom; up to the railroad bridge in Folsom?

A Between what points?

Q Between the mouth of the American, where

the American empties into
the Sacramento, to the mouth
of the Cañon at Folsom?
or up to the railroad bridge
in Folsom?

< At request of Witness the
question is read by Reporter >

A The question is not
yet definite

Q Did you personally
examine that section of the
river? A The question
is not definite as to localities
What localities do you refer to?

Q From the bridge at Folsom
to the mouth of the American
river A I did —

— ~~I~~ In company with Huntley
I walked down the river
and along the banks all
the way to its mouth,
taking notes as I went
along. The result of the
notes is mainly shown on
this map.

Q What did you find
between those points?

A From Folsom down for

some miles — I will say 5 miles — there was bank mining on each side to a considerable extent, old bank mining; that is to say, mines which were not in the bed of the river but above high water mark on the banks which had been mined out in former times. There were a few — I counted four or five — small sluices which seemed to be recent workings tailings into the river; sluices 18 inches wide and say a foot high, and small dumps in front of them, small dumps of cobbles.

Q Which side of the river did you go down?

A I went down on the South side. About a mile below Folsom near the right hand bank is a large sand ~~bank~~ bar estimated at 1500 feet long and 200 feet wide, a few feet above the river in

the bed of the river mostly of sand and some appearance of slickens at the lower part

Mr Becher What is the size of that?

a 1500 feet in length, 200 feet in width and a few feet above the river. The river at that point including the sand bar was estimated at 600 feet in width. On the 54th or 55th, the 55th or 56th mile, for three miles above Alder Creek generally speaking, the right bank was from 30 to 50 feet high; the left bank, I should say - that is the South bank. The opposite bank on the 54th mile was a high hill, a high bluff probably 100 feet high or more. Then comes Mississippi Bar, Texas Hill and Sailor's Bar in the next three miles on the north side which has been pretty extensively mined. Near the mouth of Alder

Creek I noticed water worn rocks 4 feet above the surface indicating that the river had not entirely filled up to ancient high water marks. Below Alder Creek there is slickens, what is called slickens what is now generally recognized as slickens begins to become more frequent on the sides.

① What are slickens?

A Slickens, I think properly designated is pipe clay mixed with water, finely triturated pipe clay or any clay mixed with water, and becomes a very sticky substance. It, looks very much like hydraulic cement when it is wet. I think it resembles that more than anything else.

② That is enough of that. Now follow down

A on the 57th mile the center bank is from 50 to 60

feet in height; that is below
 Alder Creek. There was some
 little water running down
 Alder Creek; perhaps 100
 inches of clear water at
 the time that I passed it
 Below Sailor's Bar on the
 58th, 59th, and 60th miles
 the natural banks on the
 opposite side were cobble
 banks; in many places.
 They exhibited cobbles with
 a small stratum of soil
 on top, the same kind of
 banks that have been
 worked and mined on
 all the bars. In the 60th
 mile for the first time I
 noticed sand drifts on
 the upland near Pike's
 place; sand beginning to
 drift in from the river to a
 considerable extent. I
 think that is where the sand
 first appeared on the up-
 land. At Buffalo Creek
 the sand banks as from 20
 to 25 feet in height for

some distance. It is a sandy bank, sandy loam, not coarse sand but fine sand. Then you come to Farmer's Bar.

Q Farmer's diggings?

A Yes sometimes called Farmer's diggings.

Q What is the appearance there? A That has been mined off at one point to a considerable extent, a number of acres. It is all full of cobbles. It shows cobbles, a large plain of cobbles, not in the river, but on the side of the river.

Q Where are the cobbles?

A They are on the South bank, above low water mark. There is quite a large amount of cobbles there. The North bank is a very high bluff perhaps 100 feet high or more than 100 feet for perhaps half a mile along. And after passing Farmer's Bar, say in the 63rd mile,

Then we may say that we
 enter the Sacramento Valley
 the high bluffs of the North
 Bank we ~~pass~~ and leave
 the river. On the South
 bank there are none. I
 find the banks to be stated
 20 feet high ^{cobble banks.} The South bank
 for the 6 4th mile is a cobble
 bank of 20 to 25 feet in height.
 Some water worn rocks appear
 in the channel there. The
 current is estimated at from 1/2
 a mile to a mile an hour
 there. At the 6 5th mile there
 appears to have been an
 old channel cutting across.
 The river seems to have
 broken through there at one
 time and has exposed a
 lot of cobble stone. I take
 it that the original soil
 has been washed off and
 exposed the cobble stone
 in large masses. There
 has been a good deal of
 mining there. Between this
 channel and a point

are large oaks still growing;
there is no soil. The river
here is 400 feet wide, the
current two miles an
hour, the North Bank 18
to 20 feet high, coarse
gravel and cobble

Mr Belcher @ at what
point is this? A That is
at the 66th mile. Slickens
appears here in a number
of places in the bed of
the river, large islands of
slickens which are shown
on the map. From the 66th
mile down they prevail
to a great extent; these
islands appearing in the
bed of the stream. They are
covered with slickens above;
under them is sand and
perhaps slickens again. I

cannot tell — fine sand

On the 69th mile, on the
South bank, the natural
bank is a cobble bank
20 feet high, with 4 to 10
feet of soil on the surface

for some distance perhaps a mile. That is just below Rontier's station, sometimes called Patterson's station. The bank is washing away there Mr. Belcher. How high did you say the bank was at Rontier's A. 20 feet high, somewhere from 4 to 6 feet of soil. It is washing away there some, I noticed it in several places. We begin to see small willows now from 63 on. Sand on the other side also. On the north bank, drift sand, sand in the neighborhood of the river. At the 72 miles, the current was one mile an hour.

Q. You are testifying from the map or from your recollection? A. I am testifying from the map.

Q. That has been your testimony entirely from Holman down? A. No sir not entirely. I remember a great many things. The map represents my memory as to Lymer

I must use the map, it is impossible to remember the heights and distances without; the map has figures and it refreshes my memory as to localities. There is very little upon it, and I have testified here referring to the map. I have said a great deal but there are only a few figures on the map. I spoke of the 70 mile, the South bank was sandy loam 10 or 12 feet in height, the bank is becoming lower as we go down stream. A sand and shingle bar is formed here. The river becomes wider. At the 72 mile on the South bank is a large sand drift in an alfalfa field. It is in Roomeys field. It extends back from the river in a triangular form for about half a mile, clean sand, and has encroached upon the alfalfa field perhaps about 50 or 60 acres in that vicinity, in fact

that whole alfalfa field
Mr. Cadwalader. Mention the
 depth of that.

A When I saw it, it was
 at least a foot deep, I
 could not speak of any more.
 I tried that and found it
 to be a foot deep at the
 edges, this whole alfalfa
 field which commenced at
 the 71 mile and extends to
 Brighton, to the 75 mile I
 will say, is more or less
 injured by sand or covered
 with sand, it is a long
 distance 4 or 5 miles of
 alfalfa field, but this par-
 ticular place is entirely cov-
 ered with sand. At the
 73 mile the banks on the
 north side - the north bank
 is 12 or 14 feet high. On
 the south side 12 or 14 feet,
 sandy, it is just below Ro-
 neys place perhaps half a
 mile below his house

2. How much bank has
 the river got there?

Mr. Becher. He states 12 to 14 feet.?

A. 12 to 14 feet

2. At low water?

A. That is the height of the bank above the surface of the water at low water.

Now from here on, well, we will say from the 77 mile, between the 77 and 78 mile at the railroad bridge

2. Where do you state the levees — where do you see the Sacramento levees?

A. As soon as we pass Rooney's station, we can see the levee, we can see the North levee

2. Have you got the Sacramento levees down in that map?

A. The levee is shown marked as a railroad. There is less sand on the surface between the river and the surface on the South bank, between there and the railroad bridge, a very considerable surface.

1. Run your pencil along the levee and go down toward Sacramento & the contour does so }

2. Did you notice the height of that levee out to the Sacramento Valley R.R.?

A I dropped it in a wagon and it is very high, I could not say exactly, perhaps ten feet high, it might be more at that place, at the crossing at Brighton, a good substantial levee

3. Did you take the elevation of that country there at the base of the levee?

A No sir, that matter has been so accurately surveyed by the State Engineer that I made not instrumental surveys. I have got down to the railroad bridge. Then the rest of the exploration was made subsequently by myself from there to the mouth, and I have a map on a larger scale which

will show it better than it
is shown on that ^{this} map

Q. Have you notes of your
Appraisal of the river from
Golson down? A. I have

I have you them with you?
A. I have

Q. What estimate did you
make of the average width
of the river from Golson
down and of the fill —
the Court of course under-
stands that we have offered
that map in evidence —

Just answer the question

A. I made no direct estimate,
it was impossible for me to
make a direct estimate of the
amount of filling between
Golson and Sacramento.

I made a conjectural esti-
mate based on other data.
I can give it for what it
is worth

Q. Well, what is your opinion
would be the average
of the river

Mr W. C. Belcher. Subject

to that as a Conjectural Estimate and of no value as Evidence

Mr. Cadwalader I do not offer the Conjectural Estimate. I will ask you if you made an estimate of the water coming out of the Cañon at Folsom, the running water?

A I do. I measured it under the Folsom Bridge and I measured it with considerable care

2 At what time?

A. At a low stage - I can give you the date

2 Give me the date?

A [referring] 7 Oct. 30th 1881

2. What's the quantity?

A The quantity was about 700 Cubic feet per second, the cross-section of the water was a little over 1000 feet - 1065 square feet, and the resulting average velocity was about $7/10$ of a foot per second which would give a discharge of 700 Cubic feet per second

I Now, supposing that water could be charged with sedimentary matter, or suppose it to be carrying sedimentary matter in suspension, at the rate of 2 per centum into the faeraments what would be the yearly discharge of that material, of that water, into the faeraments.

Mr Bleeker. I object to that as being purely hypothetical. The Court [after argument] What is the quantity for each per cent

A. 700 feet of cubic water per second, ~~carrying~~ running the year around and carrying one per cent in volume of sediment into the faeraments river will in the course of 365 days carry 8,176,000 cubic yards per annum

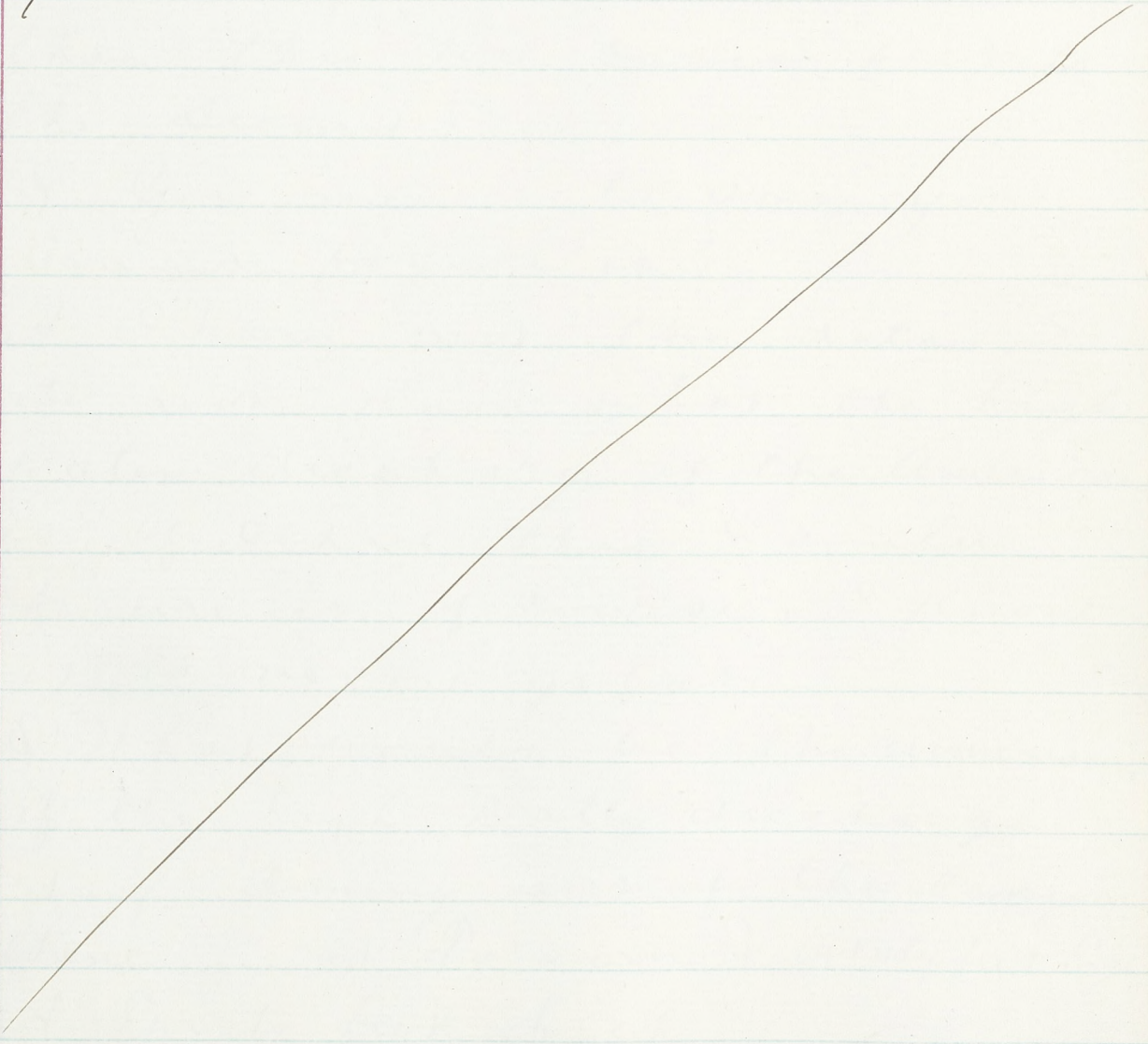
Mr Cadwalader. Now you have got the low stage. Now take the high stage of the water, say the 20 foot stage and say on that same bases

Mr Belcher. Did he say this?
700 feet was at a low stage?

A Yes sir, it was at a
low stage of the river, on
October 30th, it was not
at its lowest stage but it
was at a low stage of
water

2. Not the lowest, but low.

A. A low stage — there had
been no rains of any conse-
quence



Mr Coanwallader Well now
take what you call the 20
foot stage and with the
same percentage of sediment
as given, say the daily
discharge or the yearly dis-
charge and then we can
divide it ourselves?

A. I cannot calculate that
it would be simply enormous,
of course, a twenty foot stage
of water at one per cent would
be, many hundred times more
than this 700 cubic feet to
the second?

Q You mean to say you
cannot figure it?

A. I have not the data, I
do not know what the high
water discharge of the American
is, if I had that I could
figure it of course, I know
it is very great.

Q What would be the dimensions
of the high water discharge
say coming out of the Canyon
there at Folsom } twenty feet high

A. Twenty feet high

A The width of the River at Tolson between the Powers is 317 feet.

Q What do you call between the Powers?

A Between the Powers of the Suspension bridge which are set upon the sides of the banks. Very nearly at the bottom of the River, not quite, a little ways up I think the average width might be taken 317 feet at high water mark, at 20 feet high water mark and the bottom you might call it 200, the width of the River at present is about 200 feet. Two and three are 500 hundred and the half of that is 250, it would be fair to estimate the average that at 250 feet, and 20 feet deep as the area of the water section passing under that bridge when the water is 20 feet high with that basis I can compute of course the amount of water flowing

Q Now make your Computation
 A. I would have to ascertain
 the Velocity of the Current,
 I found the Velocity of the
 Current to be Seven Tenths of
 a second a foot per second, the
 Average depth of three feet
 I think you would call it,
 An average depth of three feet
 Q You are not obliged to do
 that Right on the spot, you
 Can take time if you want
 to } if it is going to take
 any time } A. It will not
 take long. Of course a person
 is more apt to make mistakes
 in figuring before a large
 Audience but I think I will
 get it right in a moment.
 I only work in round figures
 The Velocity of the stream at
 that height will be about
 three feet per second, The
 Area of the water section,
 there is 5000 square feet
 And three times that is
 15000, so that the discharge
 per second would be 15000

Cubic feet of water per second approximately, that is to say twenty times as much, fully 20 times more than at the stage when I measured it

Q Now I will ask you if you noticed erosion of what might be called the top banks of the American after the River got into the Valley?

A. The widening of the River apparently to top bank, the banks in many places were being washed away by the current,

Q What was the Cause of that?

A. The current being thrown over against the bank by obstructions in the River.

Q Was there any other Cause?

A. Well they were thrown across the bank or to the other bank by bars, a bar would form and throw the current over,

Q What effect would the filling of the bed have on the erosion of the top strata?

A If the original bed has been raised - if the plane of the original bed has been raised a certain number of feet say ten feet for instance, then of course the subsequent flood will attack the original banks ten feet higher than they were attacked before, they will ^{reach} ~~create~~ new material to be washed away which would not have been reached by the same floods if the River had not filled up.

Q Well are they more or less calculated to resist erosion than the lower banks?

A. As a general rule in that Valley the lighter soil is on top and they would erode more rapidly than the lower soil which was in a great measure Cobble and stones as far as I could discover observe.

Q Did you notice where the stuff forming the bars of this River came from.

12 A. You speak of it in certain

Sections of the River,

Q Well say from Pottersons down to the mouth - or state what you have to say about the identity of the stuff that you find in the River with that that comes out of the gravel mines -

objected to as leading"

Q Taking the large sand bars appearing along the bed of the River from what source would you say they came?

A From Folsom down

Q Well take any part of the River that you please?

A. There is a continuous chain of sand bars and cobble bars. In the upper reaches of the River these are heavier as I said before,

of gravel sand and stone and further down it merges into sand. The change is so ^{gradual} continuous from the mines down to the mouth of the River that it was evident to my mind that it came

from those mines, that is the greater part of it. Now we know that high water will sweep away those bars and probably has swept them away last winter. We also know that there is no mining of any extent going on below these hydraulic mines, no mining to such an extent as to form large bars. Hence we must conclude that those bars are reformed every year and again from the hydraulic mines above. I know of no other places where they could come from. Q I see that you have a place on your map marked the Iowa Hill mines?

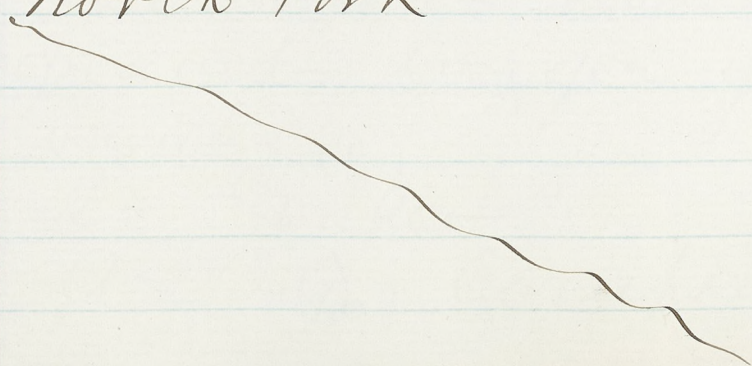
A. They are indicated on the map.

Q I will ask you if you visited them and inspected them.

A. I visited them at the same time that I did the

Goca Run mines, and
 Estimated there Contents
 And noticed there fea-
 tures and where they
 dumped into

Q At what elevation
 are they above the level
 of the American River
 A, The elevation of Iowa
 Hill is three thousand
 feet above the ~~low~~ sea,
 And by aneroid measure-
 ment and the River was
 1700 feet, that makes
 a fall of 1300 feet
 from Iowa Hill which
 is on top of the ridge
 to the River, These mines
 are from one to two hundred
 feet deep, so that the
 bulk of those mines would
 be 1100 feet above the
 North Fork



Loma Lill

Q- What are those mines called - gravel mines?

A- They are gravel mines, large gravel mines.

Q- How do they compare with the gravel mines of the defendant in this case, with the gravel mines at Gold Run? A- In what respect Sir? As to size?

Q- No. In their general characteristics?

A- They are very similar.

Q- Take first the top soil?

A- The top soil is red soil.

Q- Like that material marked "Robinson number one"?

A- Yes. It is the same kind of soil, that is partly, that was being washed in the Gold Run Mine, in one of the claims at the time. The lower soil is this gravel - larger gravel banks.

Q- Like - ?

A- (Duty) Composed of sand,

small stone and gravel cemented together, and standing very vertical, standing quite vertical when washed.

Q- Will you in regard to those materials there— One, two and three?

A- I said that the top soil was as "Robinson's Sample Number one" and the body of the mine as Robinson's Sample Number two, with strata, various strata of pipe clay as Robinson's Sample number 3; not a great deal of pipe clay in those mines to my recollection but some.

Q- Did you measure the excavations there?

A- I did, in an approximate manner. I made a note of them at the time, and computed the aggregate of the amount which I found washed out. I found that the mines tailing

directly into the North Fork
had washed about two
and one half million
yards. Total washings
out of those, tailing towards
the south, from the same
ridge into Indian Creek
about six million yards

Q- Where does Indian
Creek empty? A- Indian
Creek empties into the
North Fork about twelve
and one half miles below
Learton Creek.

Q- What do you understand
to be the dump of a mine?

A- Dump and dumping
places are sometimes
confounded. A dump
is generally considered
a place where the tailings
from the mine leave
the sluices and no more
attention is paid to them
by the owners of the mine
Q- Valueless?

A- Yes Sir. And sometimes a "dump"

is applied to the mass of material that is left in the stream at the mouth of these sluices. Dumps are sometimes quite large in the summer season and form a rather large mass.

Q- Will what I want to get at is this: did you find any deposits or bars, did you find any deposits of the matter from these mines at their dumping places in the American River.

A- I can say not. No deposits worthy of mention in comparison with the mass washed down. Perhaps a thousand yards or a few hundred yards here and there were still left at the mouth of these various dumps. No large dumps.

Q- Now were those mines as to clearness, that is clearness? A- The

Iowa Hill mines?

Q- Yes! A- They were quite clear of cobble and heavy material. No derricks were used, It seemed that the water disposed of all material.

Q- I did not exactly understand you: You say that some of those mines tail into the Middle Fork, do you? A- No. Not these Iowa Hill mines. They all tail either directly or indirectly into the North Fork.

Q- How is that? I do not understand that.

A- Here is the North Fork (indicates) Here are the Iowa Hill mines (indicates) One group of the mines tail, northwesterly down into the North Fork direct. There is a steep side hill, very steep. The southern group on the other side of the ridge - Iowa Hill

is on a very narrow ridge, perhaps but a few hundred feet wide — they tail south-
 erly in to Indian Canon
 and ~~the~~^{are} ~~water~~ ^{water} thence
 carried into the North
 Fork.

Q. Where those mines
 tail into the North Fork
 what is about the grade
 and the current of the
 river at those two places
 — at those places?

A. Where the Iowa Hill
 mines tail into the North
 Fork is between two and
 four miles below the
 mouth of Canon Creek.
 As I said before the current
 there is about three miles
 or more at the low stage,
 between two and three
 miles or more.

Q. Is there any particular
 difference in the grade
 of this ~~or~~ the grade of the
 river at this place — as
 compared with points

above and below from the mouth of Canon Creek?

A No Sir. There is not. The current is very uniform for a number of miles.

Q - How is the current of the river at Canon Creek, the mouth of Canon Creek?

Mr. Belcher - He has already gone into that very fully.

Mr. Caldwell - I was asking what the grade of the river is at that place and the current at the mouth of Canon Creek.

The Court - My impression is that he went over that yesterday.

Mr. Caldwell - Did I ask him about the character of the current?

The Court - I do not remember as to that particular point.

Mr. Caldwell - Is there anything exceptional there

in the way of grade or current? A- I did not notice anything exceptional.

2- What effect upon the current would Cañon Creek have coming in? Would it have a tendency to check or shallow the river, or would it make any difference?

A- Cañon Creek is so precipitous that it is almost a waterfall. It is hard to say. Of course, if Cañon Creek raised first, raised before the North Fork it would back the water up the North Fork a little ways.

2- I thought I understood you that there is nothing peculiar there! Had you look at this bar at the mouth of the American River in the Sacramento?

A- I did several times

2- Had the material of

which it is composed?

A- I went to the bar in June last.

Q- What do you have to say upon the subject of where they came from?

A- It has the appearance of all the bars, ~~these~~ chain of bars all the way up- sand, some coarse sand, fine sand, and clay or "slickens" mixed with it.

Some places are quite soft on the bar. In walking over it you will find that it is soft, showing that there is softer matter beneath. The bar is to my recollection about

nineteen hundred feet long, and ^{several} ~~more~~ hundred feet wide or say two hundred feet wide I

should say and from four to eight feet high.

Four feet high at the edge of the water and about eight feet high where it

joins the north bank.

Q. Do you recollect the number of men that were engaged in the North Fork mine at the time you saw it in operation there and moving so many thousand yards per day?

A. The account of labor, manual labor - I noticed in the upper mine, there were two white men and six Chinamen. Six Chinamen were working at the ground sluice, making a new ground sluice of some kind. But there was only one man at each pipe, so down below there was only ^{one} man at each giant to do that work. It is only necessary to have one man as a general rule. Of course, when there is blasting to be done, more men would be required for

the time being, and repairs are to be made from time to time.

Q- What do you have to say upon the subject of the impairment of the capacity of the American River channel or the American River channel from say ROUTIER'S down to discharge the water that goes into it?

Put that in the form of a percentage?

A- In order to answer that it would be necessary for me to know the amount of impairment to the channel, that is, the amount of filling up. In order to assume that amount it will be necessary to assume something that I am not prepared to do. It is impaired just to the amount that it has filled up from its original depth.

Q- Mr. Allardt, I want to

ask you what is the result of removing a bar from the river, that is, sending it down stream by the current?

A- A bar in the river?

Q- Yes?

A- There are various conditions - most of these bars in the river are composed of more or less loose material which is easily attacked and set in motion by the current.

When the river rises the tendency will be of course to carry this bar down stream. It may carry the whole bar down stream, if the rise is long enough.

Q- What I want to get at is, whether it is uniform or not?

A- Yes, according to the same law as soon as the current slackens the bar will be dropped in another place. It will be dropped. It will

formed lower down.

Q- Is that recognised, as so through the best books?

A- Yes. That is a natural lacu of hydraulics.

Q- Did you examine to see whether, there were any deposits of the water from the Iowa Hill mines, to the American River?

A- Any lodgment of debris from those mines that tailed directly into the River?

Q- Yes? A- There is not. It is a very precipitous slope. The descent is perhaps a little over a thousand feet and the distance is not more than half a mile or a mile.

Q- From the mouth of Indian Creek? A- There are some deposits in the mouth of Indian Creek.

Q- That is in Indian Creek itself? A- Yes,

At the mine. Quite conc-

siderable deposits there.

Q- But I mean at the mouth? A- None

at the mouth, no Sir.

Q- None at the mouth at all? A- No Sir, it

is clear.

Q- Now it is suggested that I ask you what are the material which compose the stuff that was being washed in the Gold Run mine when you were there?

Mr. Belcher objected upon the ground that the witness had stated already fully in regard to that and had brought in samples.

Q- What was the condition of the water as you came down? A- Of what water?

Q- The water of the American River A- The water

was comparatively clear. It was muddier further

down here between Folsom
and Sacramento than it
was above, but above it
was quite good potable
water, turbid,

The lower - That is a fair sample of the water as far down as Folsom? A - Yes. That is a fair sample of the water clear down to Folsom.

Mr. Hart - Was this after the mine was closed? A It was. It was in November.

Mr. Loadwader—What
was the condition of
the bed of the American
River immediately above
Lecceon Creek?

Mr. Belcher objected to the
question upon the grounds
that ^{it} ~~the~~ ^{had} ~~been~~ ^{been} ~~answered~~ ^{answered} ~~by~~ ^{by}
the witness ~~had~~
already.

Mr. Leach - Now what
did you say that it was
cobblestones and sand?

2- Had you examined the bed of the river above there?

Same objection.

The lauer - Have you described that already?

A - I do not think you Honor that I described the condition of the bed. I spoke about the water and that, I had been up four or five miles further, as far as, I see Valley and had seen the river. I do not recollect that I have described the condition of the bed. I may have done so. The record will show probably.

Mr. Leavelle - Will your Honor allow him to testify?

The lauer - I do not remember whether he described it or not.

The Witness - I suppose the usual way will be to let him describe it again.

Q - Will state what it was?

A - The condition of the bed of the North Fork above Bacon Creek is a natural

one. It has the same appearance that all mountain rivers have that I have seen in this country ~~off~~ above the mining belt. Clean nice bed, large boulders some water worn, as a ^{rule} few little gravel here and there, and sand in some places. No accumulations of any one material.

Q- You were speaking of water worn rocks. I wish you would make yourself a little more explicit on that subject?

A- What I understood were water worn rocks in these examinations, were rocks that had become perfectly smooth by the washings of the floods of, you may say ages. That is very hard rock, water worn, and with pot-holes in them indicating great age. That is what I call water worn rock, so smooth that it is very

difficult to walk over them.
 Very large boulders, a great
 number of them. I made a
 sketch of one of them on one
 of my examinations.

Mr. Belcher — Is that the
 sketch you presented to Mr.
 Woodward? A — That
 is a sketch I made in the
 field. I do not think he
 has seen it.

Recess until Monday
 December 5th, at 9.30 o'clock
 A. M.

In the Superior Court
of the State of California
in and for the County of
Sacramento

The People of the State of California vs.	} Morning Session Monday Dec 5 th / 81
The Gold Run Ditch and Mining Company	

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Wm. Fred J. Davis
Official Reporter

In the Superior Court
 of the State of California
 in and for the County of
 Sacramento

The People of the State of California vs The Fred Run Ditch and Mining Company	} Morning Session Monday December 5 th / 81
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Direct Examination

G. F. Allardt

resumed

Mr. Cadwalader. Are there any
 hydraulic mines on the North
 Fork Except such as you di-
 stinguish there?

A. There are none Except
 those mentioned, that tailed
 directly into the North Fork.

Q. I will ask you if that
 is a map drawn by you
 (Map marked Allardt No. 2
 handed to the witness)

A. It is

2. Well, state what it purports to be.

A. A sketch of the American River from Smiths Garden to its mouth as it appeared at low water, on the 18th of November 1881.

2. That nearly explains itself - you have figures.

A. Yes Sir, there is one set of figures there that might need explanation. On the South bank are figures, one figure under another, for instance 12 and 3 under it, and 8 with 3 under it and 9 with 3 under it which means, that the height of the bank over 12 feet at that point above the surface of the water, 3 feet of which was sediment. And for instance, 9 feet, the present height is 9 feet and the 3 feet is new sediment, the other is black earth. I think otherwise the map is

Self explanatory. I measured the current at the mouth, at this bar that runs into the American River and I found it to be one and eight tenths miles per hour. The water way ^{caving} keeping the banks at that time.

Q That shows a small section of the Sacramento, does it not?

A Yes sir

Q The Railroad crossing, the bridge crossing?

A Yes sir, right in front of Sacramento

Q The bars in the river?

A The bars in the Sacramento and in the American also

Q You told me this morning that you used the word Conjectural on your examination on Saturday not intending to use that word. What word did you intend to use?

A It was in the regard to the amount of debris below the Middle Fork. I said I could only make a con-

fectural Estimate, I meant to say a Comparative Estimate. It was a different thing - it was a wrong use of the word a Comparative Estimate.

I. That you intended to use a place of Conjectural.

A. Yes sir. Before cross-examination I desired to make a slight alteration on this map that I noticed after the adjournment. On the map is marked between the 20 and 24th mile "River nearly clear from Mining debris" this is above the Middle Fork and that should be placed down here above the South Fork. There is debris there as I testified myself and if you will permit I will scrap it out. It should be down near the South Fork. It is now between the 20th & 24th mile and it should be between the 45th and 49th mile and then it would be correct. (The witness makes the correction)

in pencil)

Q. Does that change involve any changes in the total of deposits? A. No sir, it makes it correspond with my testimony.

Q. Then it was just a clerical error?

A. A Clerical Error, that is all.

Crop-Examination

G. F. Allardt.

Mr. Webster Q. You spoke of the quantity of water at the upper claim that was at work in June, how did you measure it?

A. That is the north claim you speak of.

A. The Upper or North claim.

Q. You said that the defendants were running two claims at that time? A. Yes sir.

Q. One a deep pit and the other some distance above? A. Yes sir, I

measured it by means of floats and timing it in the open flume running from the mines, measured a cross-section of the flume and the velocity of the water and made the computation.

Q. Was that an accurate measurement? A. It was

a very close measurement — it was not absolutely accurate but it was a good fair measurement, for all practical purpose it was accurate.

Q. How much did you make it? A. I think

it was 1100 cuses running in that flume at the time of measurement.

Q. Miner's measurement?

A. Miner's measurement.

Q. You also took a sample of the water out of the tunnel up in the tunnel or near its mouth?

A. At the mouth.

Q. You took that from the surface?

A. At the surface.

— dipped it out with a dipper.

Q. What was the depth of the water? A. At that time about 10 inches.

Q. What would be relative proportion of sediment carried by the water for depth, that is how much more would it carry at a depth of 9 inches, than on the surface?

A. That is an indefinite question. It might not carry any more.

Q. Well would it or not, or do you know?

A. I know that there were heavier stones rolling along the bottom from time to time, I know I heard them but for what extent I could not say. There might not have been many and there might have been a great many.

Q. Do you mean to say that if a river was running at a depth of five feet, and again at a depth of

Ten feet, that the Sediment on the upper foot would be of the same Character and Amount ^{as} of the Sediment on the lower foot?

A. The Sediment in the upper surface would be lighter generally of course

Q. But the quantity the same?

A. No, I would not say that

Q. Well, can you say anything about it?

A. No, I can not say - not in regard to this flume

Q. I am not talking about a flume?

A. I do not quite understand the question

Q. (The question is repeated) - Suppose it were running at a depth of ten feet would the Character and amount of Sediment in the surface foot be the same as at say 8 feet from the surface?

A. It would not. It would be lighter.

Q. Would that be the only difference?

A. There would

be a less percentage.

2. Can you make any estimate of the difference in percentage? A. Not in this particular case.

2 I did not ask you about this particular case - Only the particular case which I gave? A. Yes; I can say generally in the measurement of rivers that where the depth of the river is more than a few feet, the sample taken from the surface, middle and bottom, the surface has the least percentage, the middle a little more and the bottom still a little more but the difference is not very great.

2. Would that be the case in a flume or well?

A. In a flume of a shallowness of 10 inches in depth, where the water is running through so violently I should say that the water was very thoroughly mixed, there

Would not be much difference
 Except the very heavy stones
 at the bottom. It would be
 difficult to get at and
 Exact figuring in that respect
 and I would not like to do
 it

Q. You gave an estimate of
 18 per cent, was that a fair
 estimate? I think it
 was, I took the samples
 several times

Q. How many times?

A. Well, I think three times

Q. Three times, that is enough
 to make several?

A. That is several

Q. Then differs full?

A. No sir

Q. Well, what?

A. I took that bottle in
 one hand, and a dipper in the
 other and rapidly poured in
 perhaps twenty or thirty dip-
 pers into this bottle, so as
 to make it as uniform as
 possible, and that I re-
 peated three times.

2. At the same point?

A. At the mouth of the
flume at different intervals

2. How long apart?

A. One was about two hours
before the other and the
others were near each other,
within a few moments

2. You took about thirty
dippers full and poured them
into what? A. Into this
bottle.

2. Did that bottle hold
twenty dippers full?

A. I did not say dippers
full.

2. How large a dipper did
you have? A. I had a

large dipper, it is hard to
explain, I held the bottle
this way, and had a large
dipper and poured the water -
a great deal of it went on
the outside, and kept doing
it until it was full - rapidly
I thought that was perhaps
the easiest way of getting
at it

Q. How large a dipper did you have? A. Probably a quart.

Q. You just took that from the surface of the current and poured it into the bottle so far as it would go, and then another one? A. Yes sir, I thought that was the more correct way than to ^{dip} the bottle.

Q. I want to ask you again if that is a fair test?

A. I think so. I thought so at the time.

Q. It is judgment now, that I want? A. I think it is now.

Q. What did you give as the height of the water or the difference rather between the high and low water mark between Canon Creek? or

A. From twenty to twenty five feet, I think.

Q. From twenty to twenty five feet. Do you mean by that from the surface as

you found it a low water
to high water mark?

A. I do

Q. 20 to 25 feet? A. Yes sir

Q. You did not mean then
to state that at forty?

A. I did not, not at that
point

Mr. Cadwalader asked him
on the basis of 40 feet from
what Mr. Gwynn and some
other witnesses said

Mr. Belcher. You spoke of
the analysis of the water and
its sediment, what do you
mean by analysis?

A. There are several kinds
of analyses, there is Chemical
Analysis and Mechanical a-
nalysis. This was properly
speaking a mechanical anal-
ysis, where we measure vol-
ume.

Q. Well measurement of
volume. Is that in any proper
sense analysis, either mechan-
ical or chemical or anything
else? A. I think

Analysis is a proper word, analyse - The work mechanical should precede it. Certainly I think it would be within what is meant by mechanical analysis. There is in Chemistry qualitative and quantitative analysis, as to quality and quantity. This is merely a mechanical process of arriving at the same results that the Chemist does in qualitative analysis where he evaporates the material.

2. Other kind of analysis, mechanical analysis something that is recognized in those text-books you have mentioned? A. I think it is.

2. In which one?

A. It is made use of in all river measurements.

2. I ask you about a text-book. Is it in Le Conte?

A. I do not know that it is in Le Conte.

2. Is it in Trautwein?

A. You mean the rule by which these kinds of analyses are made?

Q. I mean any thing about mechanical analysis, is there any such term used in either of the text books you have named, and if so which one?

A. I do not remember any text-book, where it is named that way, by that name.

Q. Then this is a new analysis which you have invented?

A. No, not at all.

Q. Do you find it in the tables of the French Cavalier whom you mentioned yesterday or Saturday, as being prepared tables?

A. Those tables are entirely on another subject. They are not on the subject of analysis. This is simply finding out —

Q. No matter what it is you have already told what it was. You answer such questions as are asked you and

and then if an Explanation is needed you can make it under the direction of the Comt.

A. I will endeavor to do so

Q. You said, that you had verified Dubois's tables?

A. I did not say I had verified his tables, I said I had verified some of the propositions laid down in the tables

Q. Some of the propositions?

A. I had observed them in nature

Q. Well, did you mean observe or verify? I would like to know which you used?

A. I have verified them by observation

Q. Is that a verification — Is that what you meant by verification?

A. It is. I mean by verification proving a proposition to be true, that is verification.

Q. Which one of the propositions did you prove

A. For instance, that very Swift —

Q. Just state the proposition first?

A. I ^{was} not allowed to state the proposition in my direct Examination.

The Court, Do you understand the question?

Q. What is the question Mr. Belcher (question repeated)

A. I will state that I was not allowed in my direct Examination to state any proposition of Dubois ^{du Bois}.

Q. You are asked now to state the proposition.

A. Dubois ^{du Bois} lays down in his tables that a current of $\frac{1}{6}$ mile per hour — as soon as a current exceeds $\frac{1}{6}$ of a mile per hour it will move light clay in the water. Now I have seen that a great many times when the current with a little more than $\frac{1}{6}$ of a mile an hour, perhaps a quarter of a mile an hour, or a half a mile an hour, that it did ^{move} ~~move~~ ^{move} ~~move~~.

light material, shelled in this case, and so on with sand and small pebbles. That is as far as my observation goes.

2. Do you know how these tubes were prepared, how Dubouche ^{or Bouché} made his Experiments? A. They were made many years ago I do not remember the details of it. In my reading I understand that he had made Experiments.

2. Are they mathematical propositions? A. They are not. They are Experiments. They are results derived from actual Experiments, so stated.

2. And does he give any statement in regard to it?

A. To the Experiments that he made, so that another might verify them? A. Yes sir.

2. Then he tells how he performed them so as to give all the data from which another might judge

of their correctness?

A. All the data necessary for that purpose is in the table

Q. No matter what is necessary, I want to know what he gives? C. I am trying to answer the question

Q. You are saying what is necessary (question repeated)

A. He gives the velocity of the current that will move a certain material. Now anybody can create by an experiment a current of such a velocity, and put in such material and see if it does move it. That would verify it. And if such a velocity as he states moves material that would satisfy him that that part of the table was correct.

Q. Does he state that simply without qualification that a current of a certain velocity will move a certain kind of material, or does he give you any-thing in regard to the

Surface in which it has to be moved? A. The does not that I know of

Q. Would it make any difference if it were of glass, or sandpaper, or iron or wood?

A. I think not except in the velocity with which it would be moved. As long as there is no obstacle in front of it, it would move no matter what the surface was at the bottom, on a rough surface it would move slower but still it would move.

Q. Why should it move slower on a rough surface?

A. On account of the friction against the bottom - greater friction.

Q. But would move the same except that it would be a little slower?

A. I should think so

Q. Well now, you have measured the depth of the stream by your horse, did you measure the length of

of the Steam by your horse
in the same way?

Q The length, the distance?

A Yes sir. A. I did
by timing the horse between
known points. One was by
the movement of the horse
and the other was by the
length of the water on the
horses legs.

Q How high a horse did
you have? A. I had
a horse whose knee joints
were I believe 15 inches from
the ground.

Q Did you have an odometer
as a mode of proving any of
the depths? A. The o-
dometer would not apply as
to measuring depths.

Q Did you for distance?

A. Yes sir, a horse-meter
would be probably the right
expression. The gait of a
horse and the gait of a man
are very uniform, they travel
about the same rate with
the same gait.

2. A horse and a man?

A. The rate of a horse's travel — with the same horse he will travel the same rate for distance — if he is walking he will travel at so many miles an hour with great uniformity and so will a man, they have then regular gait it is a very close approximation to measurement

2. Were this horse's gait tested? A. I had ridden him for 6 or 8 days

2. Had his gait been tested?

A. It had been tested in this way, by comparing with that of a man walking alongside of him, but the rate of the gait had nothing to do with it — The rate of his walking had nothing to do with it

2. I want to know whether the rate had ^{been tested, not if it had} anything to do with it?

A. His uniformity of gait had been

Q. So as to know that this gate was uniform?

A. Yes sir

Q. Up hill and down hill?

A. On a level where I made use of that

Q. No matter whether the surface was smooth or rough?

A. If it were rough he could not go so fast

Q. Was this a mustang?

A. Well, I am not much of a horseman, but I think it was - I think it was a mustang.

Q. He let you measure his legs?

A. Yes sir

Q. Was that with a tape line?

A. With a foot rule.

Q. You found that from the foot up to the knee how many inches?

A. 15 inches

Q. Have you seen horses that when they step, drop down the joint, the angle would drop down considerably, the next joint above, and other would

Stand very straight?

A. I can not say that I have observed that

2 You never noticed that?

A. No sir

2 Did you notice in regard to this particular horse whether there was any peculiarity of this kind or not?

A. When he stood still his leg was straight at the time of measurement

2 That you remember?

A. I do, yes sir

2. Now after the first 9 miles did you go down in the bed of the stream then - Can you answer without looking at your map

Mr. Cadwalader. The first 9 miles from where sir?

A. The first 9 miles from Canyon Creek

Mr. Belcher. Where did you begin?

A. A part of my explorations up stream

2 Where did you begin?

Q. I began at Folsom
 2. Would you call the first
 9 miles of your working,
 Commencing at Cañon Creek,
 did you work Commence there?

A. It did not.

2. Where did it Commence?

A. It commenced at Folsom
 2. The first 9 miles that
 I had reference to were from
 Cañon Creek?

A. Yes.

2. After the first 9 miles
 or 9½ miles, did you follow
 down the stream in its bed

A. For about a mile I did
 not. It was too precipitous
 and I did not consider it
 safe for myself to walk down.
 My assistant walked down
 that mile or so, till we came
 to the place where we had
 been in the river with the
 horses — closed the gap — I
 saw it from the hill tops
 though, this interval

2. How high?

A. Different heights

2. Approximately would you say?

A. It might have been perhaps 500 or 600 feet above the river, that is the Cañon or gorge, the proper word would be gorge.

2. And from that height you estimate the debris?

A. I saw that there was no debris in the river at that place - it was a gorge.

2. There was none there?

A. No sir.

2. Did you ride along the bank of the precipice or the edge of it, so that you could look down into it?

A. Yes sir.

2. You could see the whole river? A. At different places from point to point I could see the whole river that I did not travel in.

2. For the next 28 miles with the exception of this mile, did you follow down the bed of the stream?

A. I followed up

2. Up the bed of the Stream for that 28 miles?

A No, I stated in my Examination (referring to map)

2. $9\frac{1}{2}$ miles takes you down to what point?

A $9\frac{1}{2}$ miles takes me to the rocky Cañon below Rees Bridge, immediately below Rees Bridge. Then there is an interval of a mile or so unpassable for horses. Then from the 12 miles - Say from $11\frac{1}{2}$ miles to $19\frac{1}{2}$ miles, travelled in the river

2. Travelled up stream?

A Travelled down Stream on another day

2. Well, what did you do for the next 9 miles?

A. The 3rd nine miles

2 After the $19\frac{1}{2}$ Can you tell by your recollection, or have you got it all written down on that map?

A. There is nothing written down on the map in that respect

Q. Have you any recollection?

A. Yes sir.

Q. What I want to know then is, what did you do for the next 9 miles?

A. I will have to see where those 9 miles go to (referring) the next 9 miles brings us to the junction of the Middle Fork. At that point I rode up on the North bank, on the hill tops.

Q. How high?

A. Sometimes 500 sometimes perhaps higher than that, perhaps a thousand feet.

Q. For that nine miles?

A. Not entirely.

Q. How much of it?

A. In the great part of it.

Q. How much of it?

A. Perhaps 5 for three or four miles going out on the spine and looking at the river noting the points that I had seen on the river by some natural object

and then took the next point, where I came approach the river again, and saw it, looked at the next reach of the river

Q. You estimated the amount of sediment or debris there, the amount of deposit from this reach.?

A. I estimated from subsequent comparisons

Q. Did you estimate it from your reach, as you were on the hill-top?

A. I desire to explain.

Q. Please answer the question

A. It would be necessary for me to explain that

Q. Can you answer the question directly or not?

A. Yes sir, I do from that Elevation

Mr. Chadwalader Now I suppose the explanation is in order

A. The gentleman speaks of Estimating, I said in my direct Examination that those 9 Mules were not examined with that minuteness as the previous seventeen Mules

but, that I saw in my Exploration after comparing the two, that the last nine miles there was considerably less debris in, than the first 18 miles, but in my estimate I called it the same.

Mr Belcher. You had already stated that in your direct Examination? A. Yes sir.

Q. Then was it necessary for you to repeat it here?

A. I thought it was necessary to answer the question.

Q. Going below the mouth of the ~~Madde~~ Madde Fork or the junction of the Madde Fork was the North Fork how there did you follow the stream or its banks?

A. I followed its bank, at different elevations, seeing it all the way.

Q. About how high?

A. At a number of points we were right close to the river, and then 50 or 100 feet elevation, as near as I

Crossed side to another point a little higher, perhaps 1000 feet at times, the river runs right under us very plain.

Q. And from these points you estimated the amount of deposit in the streams?

A. Yes sir.

Q. That gets you down to what point — down to the mouth of the South Fork from the Middle Fork — does that take you to the South Fork?

A. Yes sir.

Q. Now, from the South Fork to Polson? A. From the South Fork to Polson I walked up subsequently.

Q. You walked up the whole distance? A. No sir, not the whole distance but as far as to cover a gap that I had ^{not} seen before.

Q. How far did you walk up? A. About 2 miles from Polson.

Q. Did you walk up past

what is called the State Prison
Ravine? A. Very close
to it.

Q. You followed up in the
bed of the stream?

A. No sir, right in the bank.

Q. On the bank, following
the road? A. The part that
I walked was on the fourth
bank following the Railroad,
there was a Railroad.

Q. Following the Railroad
on the South Bank?

A. Yes sir and on the
North Bank I rode on another
day.

Q. Following the road

A. I rode on horseback
part of the time near the
river and part of the time
some distance off, but al-
ways having the river in sight.

Q. How far up on the South
Bank did you go on the Rail
road track?

A. About opposite that
Granite Mill; that granite mil-
ling that is on the other

side of the river.

Q. Is that up to the State's Prison? A. Not quite, but you can see up as far as the State Prison, you can see the river without any trouble at all.

Q. Could you see the mouth of the South Fork at that place? A. No sir, I did not see it that time. That was the time I rode

Q. On the north bank following the road what was the Elevation approximately?

A. All elevations from 100 feet above the river to perhaps 1000, I did not measure the Elevation.

Q. And from these points you saw the bed of the stream?

A. I did

Q. And calculated the amount of deposit or estimated it?

A. I calculated the nature of the deposit, yes sir - I estimated the nature of the deposit

Q Not only nature but amount?

A Yes sir, I estimated the amount

Q. Nature and amount. Did you have a spy glass?

A No sir I did not

Q. In following down the natural bank did you follow the road? was there a road?

A. Which part of the river sir

Q. In either part?

A. Generally we did not follow the road, we went through the brush and made very slow progress

Q. I understood you to say on your direct examination that the brush was impenetrable. You did not mean that it was impenetrable

A. In a great many places it is impenetrable, very troublesome to get through, you have to pick your way

Q. Did you have have a machete to cut your way through?

A. No sir

Q Now from Falsom down
did you walk? A I did

Q All the way?

A All the way

Q Following the stream?

A I did

Q You saw Texas Bar or
Texas Hill? A Yes sir,
I saw all those bars

Q Which side of the river
is Texas Bar or Texas Hill?

A I think it is on the north
side, my recollection is

Q Have you represented it on
the north side on your plat?

A I do not know whether
I have or not (referring)
Yes sir I have. It is so rep-
resented

Q Have you given the extent
of that bar, or of any of the
mining bars or mining locations
as you followed along the
bank of the river?

A No sir, not on the map.

Q Not even approximately?

A No sir, I cannot not hardly
approximate.

Q. You could not approximate
A. Not hardly

Q. Why not?

A. The country was so large, the extent was so great I had no means to do so - It would require a survey to make any sort of an approximation as to the extent of those bars.

Q. You were not surveying anything except the Gold Run?

A. No sir, I was surveying to ascertain the amount of the debris.

Q. What is that?

A. The main object of my survey was to ascertain the course of the debris and what became of it, that was the object of my survey, I had that object in view all the time.

Q. And you marked the Gold Run in red up there, so as to make them prominent?

A. I did.

Q. And you did not mark any of the others in red?

A Which others, Sir

2. Any others?

A I marked all the hydraulic mines in red, the large hydraulic mines

2. Do you know whether there was any hydraulic mining at Folsom?

A. I did not call that hydraulic mining

2. I ask you if you know about it. No matter what you call it?

A. No. I do not think there was any hydraulic mining at Folsom

2. You do not think there was?

A. Not what I call hydraulic mining

2. Not what you call it?

A. Yes Sir, it is a difference of degree perhaps

2. Do you know whether monitors were used there or Little Giants?

A. I never saw any indication of it

2. You never saw any indications

A. I did not in this trip

2. Did you examine the banks

A. Some of them

Q. Or go into the claims

A. Some of them, you ^{yes sir} see

Q. Did you go into any claim on either side of the river above Folsom and between that and the mouth of the South Fork?

A. The mouth of the South Fork yes sir. I passed through several claims there - I passed through several small claims.

Q. Did you find any claims that were at work, between the mouth of the South Fork or that had been recently at work, between the mouth of the South Fork and Folsom - Folsom bridge?

A. There was none at work when I was there. I could not say how recently.

Q. Were there any indications of recent work?

A. I saw a few flumes as I stated before.

Q. Did you examine suffi-

Curiously as to be able to determine whether there was or was not work then being done or which had very recently been done between Tolson and the mouth of the South Fork? A. There was nothing dramatic meaning going on at that time. As to whether it was recent or not I could not state.

2. Did you examine any claims between those two points?

A. Between Tolson and the South Fork?

2. Between Tolson and the South Fork?

A. Nothing but mere inspection as I passed along.

2. Did you inspect as you passed along?

A. I looked, yes sir. I looked at the excavation.

2. Of whose claim if any?

A. I could not say.

2. Where were they?

A. Above Tolson.

2. How far above?

A. Starting from Tolson and continuing up a little way perhaps a half a mile

Q. For half a mile above Tolson, you did not go to the claims, but merely saw them at a distance?

A. Yes sir, I went through some of the claims.

Q. You did not enquire what?

A. Well there was nobody there to enquire of.

Q. You had nobody with you that would tell you?

A. Nobody that knew

Q. You did not make much enquiry of any body as you were travelling, did you?

A. Oh yes sir, whenever we met any body we enquired.

Q. Did you wait for Tolson to Alder Creek?

A. Yes sir I did

Q. Along the bank of the river?

A. I did

Q. Mining there or evidence of mining? A. There was evidence of mining

But there was no mining going on

Q. No mining at that time

A. No sir, not at that time

Q. Evidence of extensive mining?

A. No sir, small mines

Q. Small mining?

A. Small shutes

Q. High banks? A. The banks were perhaps 30 or 40 or 50 feet above the river generally along those bank mines

Q. How high was the bank itself where the mining had been, or had been recently done

A. Below Tolson?

Q. Between there and Alder Creek? A. These mines were almost entirely filled with cobbles

Q. That is not the question that I asked you?

A. The banks were ~~not~~ hardly visible — that is the banks were hardly visible being obscured by cobbles.

Q. Did you find any tunnels there?

A. I saw one

short tunnel between Alder Creek and Polson. I remember that, running into the bank.

Q. Running into the bank about ~~what~~ what place if you remember? A. Perhaps about 100 feet long, I do not know ^{that} if I can identify it on the map. I should say it was about half a mile or a mile above the mouth of Alder Creek.

Q. What was the height of the bank? A. It was about 50 feet, probably at that place - quite a bluff bank.

Q. That was the mining bank?

A. That was the natural bank of the river.

Q. Was that the bank or face of the mine? A. No sir, that was the natural bank. This tunnel went to this natural bank back to the flat into these cobble mines.

Q. Now what was the height of the mining bank?

or face of the claim?

A Well ten feet perhaps
would be the highest I saw

Q. Ten feet over the highest
you saw? A. Yes sir at
that point

Q. You went to Negro Hill?

A. No sir, I did not

Q. Did that tunnel pass under
the Railroad, that you saw?

A. Oh no, it did not reach
the Railroad at all

Q. You did go to Negro Hill?

A. No sir, I did not

Q. Nor to Texas Bar?

A. Texas Bar or Texas Hill

Q. Either the bar or the hill?

A. I only remember of Texas
Hill, that I mentioned

Q. Did you go to that?

A. I saw it from across the
river

Q. What did you estimate the
height of the face of the claim
there? A. I can not

identify that particular
hill. That side of the river
it was 30 or 40 feet high

Something like that - the bank
2. 30 or 40 feet high?

A. Yes sir

2. Do you mean that was the
face of the claim or the bank
of the river? A. I do not.
I mean that was the height
of the bank above the river
and the surface dirt was
washed off a few feet

2. There was no face of
the claim then present there

A. Nothing that was not
at all prominent or conspic-
uous that I saw

2. Did you visit Mississippi
Bar? A. That is on the other
side of the river, I did not
visit it but I saw it from
the opposite side

2. You could see that?

A. Yes sir

2. What was the height of
the face of the workings there

A. I think about the same,
those bars most of them are
30 or 40 feet. They vary in

3577 height, above the surface of the water

Q. Are you talking about the light of the land above the river or are you talking about the claim?
A. No sir, I am talking about the light of the bank above —

Q. Is that what I asked you?

A. I understood it so, yes sir.

Q. { question repeated }

A. I could not state

Q. You could not estimate at that distance?
A. No sir

Q. How far away were you?

A. I suppose it must have been a quarter of a mile

Q. On very nearly a level?

A. I did not try to estimate it.

I did not make any note of it at the time

Q. You did not estimate anything of the quantity of mining ground that had been worked at all after you left Gold Run, did you?
A. No sir, not of the mining ground

Q. Or the extent of mining?
A. No sir

Mr. Cadwalader. You mean along the river?

Mr. Belcher. I mean any where —

Had you been up the Middle

Rock?

A. No sir

Q Why didn't you go up the middle fork? A That was not in my line of examination. I was to examine the North fork

Q You were to examine the North fork? A Yes Sir

Q Under whose direction?

A Under the direction of Mr. Cadwalader and the Attorney General

Q He did not want you to examine the middle fork or at least did not ask you to?

A I think he did tell me to examine the middle fork but there was ~~not~~ time. I think I have it in my instructions to look at the middle fork and the South fork but there was not time to do it

Q Well I ask you now then if you have ever been up the ~~middle~~ ^{middle} North fork? A I can say nothing

about the ^{Middle} North ~~fork~~ from
observation

Q Have you ever been
up the South fork?

A Not with the object
of looking at the mines.
Some years ago I was up
there

Q Up from its mouth
following up its course?

A No sir in travelling
up the Country

Q Only in travelling
through the Country as
you crossed it?

A Yes sir

Q Do you know any
mines then along either
of those forks either the
Middle or South fork,
mines, or mining?

A Not ^{by} ~~by~~ ^{from} personal
inspection - not from
personal inspection

Q Had you ever been
up the North fork prior
to the month of June
of this current year?

Ans sir except as a traveller upon the rail road. I have no knowledge of it except in that manner, in that way.

Q Never had given any attention to it?

A I always looked at the river when I saw it, and saw its condition, travelling

Q You saw that from the railroad?

A Yes sir and from some other trips that I made, I do not remember now. It was always a very conspicuous object to look at

Q When you rode along on the railroad did you estimate the amount of debris? A I did not

Q Can you determine - is your eyesight so good that you can estimate at long ranges the quantity of debris

that you find or sediment
or the character of the
work that is going on?

Ayes sir, I can
estimate the width of
the river; I can see
whether the river is
clean or whether water
worn rocks appear
and objects of that kind
are very conspicuous at
a long distance. A man
can form some estimate
from that kind of in-
spection

Q What would you
call a long distance?

A Well about a mile.
A man can be seen -
I can see a man a
mile very distinctly,
an object as large as a
man

Q And if you knew
exactly how tall the
man was you could
calculate approximately
the size of other things

in proportion?

A That would be one comparison

Q When you got down to Rooney's you found an alfalfa field?

A Yes sir, before I got to Rooney's

Q Before you got to Rooney's. How long was that field?

A It was several miles long. I did not measure it, I compared it. I had the map with me upon which the alfalfa field was designated and compared it and came to the conclusion that the map was properly drawn from the surrounding circumstances so my measurements are from the map subsequently

Q You did not take that at all from your own observation?

A Yes sir in connection

with the map. I found
the map was right and
then it was easy to
measure on the map
the distance by scale
Mr. Cadwalader What
map was this?

A This ^{big} map that is here.
Mr. Belcher Q That was
the one field you had
marked on this map,
this one field?

A I had this map with
me, it was already drawn.
The map was drawn
before I went in the field.
a great part of it and
this amongst it - this
item was amongst the
items.

Q When you came
there and unrolled the
map to see if it properly
represented the field,
and seeing that it did,
standing at its lower
end or upper end?

A All along, I noticed

where it began and where it ended

Q I think you gave the length of that field in your direct examination. Perhaps I did

Q How long was that? A I think I said three or four miles in my direct examination — three or four miles. I said it extended to the Western Pacific railroad

Q Now in your examination here you say you did not go up the South fork or middle fork. Did you go up the North fork above Canon Creek?

A I did not walk up in the bed of the stream, but I was in the bed of the stream about three or four miles above there at Green Valley. I have been there several times.

Q At the valley?

A Yes sir and you could see down the stream and up stream

Q Four or five miles?

A Yes sir a good part of the way

Q That is all the examination you had ever made of that?

A That is all

Q Now could you from Green Valley see down to Cañon Creek, or three or four miles?

A From Green Valley, you can see there above, by getting on an eminence you can see to what is called Devil's Gate, that is several miles below Green Valley and then from Cañon Creek you can see Devil's Gate, so that you see it both ways

Q Now do you mean to have it understood

from your answer that from an eminence from the valley you can see the bed of the creek to Devil's gate?

Ans I do not mean to say that

Q Do you mean from your answer to be understood to say that from Cañon Creek you can see the bed of the creek up to Devil's gate, that you can answer without explanation

A Your question is one eminence. From different eminences you can see the river from Cañon Creek to Green Valley.

Q From different eminences? A Yes sir.

Q Did you go to those eminences? A I did.

Q For the purpose of seeing it? Ans sir not for the purpose of seeing it but for instance

I went on the Iowa Steel
rail, the rail from
Iowa Steel and then I
could see the river all
the way up. That was
at another time. I made
~~at~~ note of it at the
time

Q To Iowa Steel above
or below Cañon Creek?

A Iowa Steel is below.

Q How far below?

A A mile or two

Q When you got one
mile or two below you
can see better than
you could there?

A No sir

Mr Stuart That is not
what he said

Mr Belcher Q How far
is it from Devils Gate
to Cañon Creek?

A I think it is about
a mile, something
like that

Q Is that marked on
your plat? A No sir

it is not

Q How far is it from the point on the Iowa Steel trail where you could see the bed of the stream to Devil's Gate? A I do not know exactly. A mile or so, perhaps it might be more

Q Could you indicate the places on the trail on the map?

A No I think not. The river below is like a panorama. It is quite visible - it is not visible all the way from one point, but as you pass from one point to another that part of the river you did not see before you would see then so that I think it would be proper to say we saw pretty much the whole river

Q Could you tell there,

looking at you please now
whether the points of
observation were 1, 2, 3
or 4 miles away from
Devils Gate?

A I should think it
would not be more than
1 or 2 miles possibly

Q 1 or 2 miles?

A Perhaps in a straight
line—, perhaps one mile

Q At what elevation?

A At various elevations
all the way from the
river up to Iowa Hill,
up a thousand feet
above the river

Q What direction does
the Iowa Hill trail run
from starting from Gold
Run? A I am speak-
ing of the Iowa Hill
trail from Colfax

Q Where is Colfax there,
above or below?

A That is below Gold
Run

Q How far below?

A About 8 or 10 miles

Q Mark it there on the plat and indicate it.

A It is marked at this point <referring> marked Colfax.

Q There is Colfax? Ayles^{sin}

Q Where is the trail?

A The trail passes and goes over Stephen's bridge

Q Following down to the bank of the river?

A Winding around and gradually descending to the river

Q It is a gradual descent from Colfax to the bridge? Ayles^{sin}

Q And then from the bridge? A Then it begins to ascend going up the river, winding in every direction zigzag up to Iowa Hill

Q Now Iowa Hill is how far from Gold Run?

A In a straight line about four miles

Q Now were you on that trail at any point nearer to Devils Gate than you would be at Iowa Still, or much nearer?

A Yes sir I travelled the trail from Iowa Still to Cold Run also, that is nearer

Q Let us talk about one trail at a time

A You asked me whether I was nearer

Q On that trail?

A On that trail, no sir. Yes I was. I have refreshed my memory in that matter. When I was at the Iowa Still mines I travelled up the Iowa Still ridge for a long distance and had a view of the river.

Q We will come to that presently, but first of all I want to know about the trail from Colfax to Iowa Still

Ayes sir.

Q Were you at any point there in a direct line nearer than five miles to Devil's Gate or nearer than four miles to any part of the ^{bed of the} stream about which you testified there?

A Above Cañon Creek?

Q Above Cañon Creek.

A It is hard to estimate distances. It might have been two miles, I could not estimate the distance.

Q Your map does not show distances accurately.

A Yes sir it does.

Q It does show distances?

A Yes sir.

Q Can't you estimate them with the same degree of approximateness?

A Devil's Gate is not marked on the map - it is not designated.

Mr. Leadwalader Q Is

Cape Horn marked on that map? A It is

Mr Belcher Q You made an estimate at the rail road bridge if I understood it near Folsom of the discharge?

A I did

Q Of the water and sediment? A Not of the sediment, of the water

Q Only of the water?

A You mean in Court here?

Q I mean in Court

Ayes sir I made an estimate of both sediment and water

Q Did you use a formula for that?

A I did

Q What is the formula that is used?

A The formula for ascertaining the velocity

Q Give the algebraic formula if you have it.

a For what object? To ascertain the velocity?

Q The one that you used in ascertaining that, in making your determination?

A The formula was that the velocity increased as the square root of the ~~depth~~ depth, as I stated, was an approximate formula

Q You stated the sectional area at 1065 feet if I remember correctly? A I did.

Q That was at a depth of what? A At various depths, varying from nothing to, I believe, the deepest place was 13 feet the deepest hole

Q And the average was what? A 3 feet

Q That you say was in a deep hole?

A The 13 feet. That was only a small portion

of the stream that had this 13 feet depth

Q At 3 feet and with a sectional area of 1065 feet, you gave the velocity as what? A The mean velocity I think was $7/10$ of a foot per second

Q Then you were asked taking that as a basis, suppose then that the depths were 20 feet instead of three as to the quantity of water discharged? A Yes Sir

Q And you determined the velocity and quantity approximately? What was it? A I said the velocity would be about three times as great

Q The velocity then would be how much?

A It would be a little over 2 feet per second

Q 2 feet and one tenth?

A Two feet and one tenth

Q Is that what you gave before? A I think I stated that the velocity would be about three times as great — yes that the velocity would be about three times as great, I think I stated that

Q I understood you to say 3 feet per second, perhaps I was in error?

A. Three feet per second

Q. First I will ask you what should be the formula for determining what the velocity would be? A The velocity varies as the square root of the depth. Take a depth of 3 feet. the square root of three — the assumed depth, and the square root of 20 and find the proportion between them and multiply it by the velocity

Q Will you take a bit of paper there and determine what that would be — have you an algebraic formula for that — make your calculation first?

A That is an algebraic formula itself. I suppose, the square root of three is 1.7 and the square root of 20 is 4.5. The exact proportion between them is 2.6

Q What does that give you — 2.6? What is it?

A That is the rate by which the velocity would be accelerated by increasing the depth to 20 feet

Q That would be the acceleration? Ay es si.

Q Then you will add that to the 7 tenths?

Ay es si

Q Do you add or multiply or what?

A Multiply by 7 tenths.

Q Then what do you get as a result? A. 1.82

Q Then your calculation of 2 or 3 was not a very accurate calculation?

A No it was not accurate it was not intended to be accurate at all, it was merely an approximation

Q 3 would not be a fair approximation for 1.8? A I did not say that it was, 2.6 times. I called it 3 times. I was asked to make an approximation and stated that the velocity would be increased 3 times

Q No sir you said 3 feet or I am very largely mistaken

A Yes I did say that. The question was if the velocity is one foot per second what

would it be if it was
20 feet deep? I said
was 3 times as great

Q That is not the kind
of formula that was
presented to you at
the time because you had
fixed it as 7 tenths of
a foot per second. Now
what is the formula
for calculating discharge?
- you may write the
algebraic formula there
on another piece of paper
A The velocity of any
stream -

Q (interrupting) What
do you have to represent
the velocity? A The
formula is: $(v = 1.26 \sqrt{mh})$
- v is equal to 1.26
multiplied into the
square root of mh , v
representing the velocity,
 m representing the mean
hydraulic depth, and
 h representing the fall
per mile in feet.

Q In representing the hydraulic depth, you mean the hydraulic depth in feet? Ayes sir

Q And you have 1.26?

A As a coefficient

Q Is that a constant coefficient? Ayes sir
Constant

Q Is this a constant formula, that is would it be a formula applicable to the river at any stage you should find it — I will ask you if you were to be asked to go down here to the Sacramento and determine the velocity, would this be the formula you would use.

Ayes sir. The authorities differ a little, that is to say some authorities state that this formula does not give sufficient quantity for large rivers, that

the coefficient ought to be somewhat increased.

Q How much increased?

Mr. Caldwell State that again

A In applying that formula to the discharge of large rivers, some authorities consider that the coefficient is not large enough that this formula will not give a large enough discharge and some, such as Eidlewein put it at 1.31 instead of 1.26, the difference is not great; it is immaterial really.

Q Does ^{Eidlewein} Eidlewein give this formula. A He does.

Q Does he give any other formula or the same formula in a different shape?

A I only know of that one formula, that he gives it for larger streams and the coefficient for

the discharge of smaller streams is somewhat less than that for the discharge of larger streams. It is the only one that I remember that makes the distinction between streams, the decreased friction in larger rivers giving a larger discharge.

Now if we wanted to determine from this formula the value of h , what would it be? Please give us the formula.

A It requires a transposition of the same formula only. I will have to work it out, it is equal to V^2 divided by the product of the square of 1.26 into m . That formula I deduced from the other one.

Q That gives you the value there. Now for the determination of the amount of discharge

What formula do you use? A The amount of discharge of water?

Q Yes in cubic feet
A Having ascertained the velocity, the mean velocity of the stream is is only necessary to multiply it by the area of the water section

Q Then you have given the formula for velocity now give the formula for discharge

A The formula for discharge — we will call q the quantity, the discharge. q representing the discharge in cubic feet per second. q equal to av ; a representing the area of the cross section and v the velocity

Q That would be a simple equation with a and v only upon the one side? A That is all

Q When you use a you mean the sectional area? Ayes sir

Q How do you determine the sectional area?

A The sectional area must be determined by actual measurement or by assuming it either way

Q If determined by actual measurement, how then? A Soundings must be taken at a number of places and cross sections platted on paper and the area computed

Q Now in estimating the quantity discharged in any given time do you take into consideration the extent of the bed of the stream? does that enter into it at all? Ayes sir that feature is contained in the letter m.

Q As you have it in
v. ? A Yes sir

Q You left it out in
the formula; you just
give the answer $q =$
av? A No, I do not.

Q You do that in the
determination of the first
It is that included in
m? I understood you
to give a distinct mean-
ing to m

A m I stated was
the hydraulic mean
depth; that is to say
m is the area of the
water section divided
by the wetted perimeter.

Q And when you say
the wetted perimeter
here you mean the
entire measurement
of the bed of the stream
with its banks?

A Yes sir. That is the
exact formula

Q Do you mean ^{to give} now
1.26 and 1.31 as the

extremes of this coefficient?

A 1.31 is the extreme as the maximum and 1.16 is the extreme in the other direction, the minimum

Q 1.16 is the minimum and 1.31 the maximum?

A Yes sir from the authorities that I remember

Q And between those two will suit all rivers and streams of water?

A Yes sir

Q 1.16 would be for a very small rivulet?

A For a comparatively small water course

Q Would it answer for a small rivulet?

A Yes sir it would answer for a flume — a small flume

Q For a rivulet or flume? and 1.31 for the Amazon or Mississippi?

A Yes sir

Mr. Cadwalader

I suppose

this is all book learning
Mr Belcher I take it
 you give these not as
 formulas derived from
 books, but from those
 which will accurately
 determine, first, the
 velocity which you
 have given, and second,
 the amount of discharge
 within a given time per
 second or per minute
 as the formula might be
 given? A Yes Sir they
 do that. They are all
 derived from books

Q You mean that all
 the knowledge that you
 have of this, of the
 formulas you have
 given and of their
 accuracy is simply
 that the books say so?

A The books are our
 authority on those matters

Q Well I ask you if
 that is all that you
 know about them, simply

that the books say so?

Ayes sir and also that I have in my early days demonstrated the formulas. The formulas are based in mechanical laws and I have demonstrated them, and after that having demonstrated them, that they were properly carried out in these books I have always assumed them to be correct.

Q You say now in your early days you demonstrated this formula which you have given here? Ayes sir

Q That $n = 1.26$ or varying between 1.16 and 1.31, that is a variable coefficient is it not? A I do not mean that I have verified the coefficient, that has been ascertained by authorities.

Q Then you rely upon the authorities? Ayes sir we take it as approved in

our profession

Q Whose tables do you take for that? A The coefficient I first gave is Weinbach

Q That is 1.26? A Yes sir

Q That is for a medium sized stream?

A It makes no difference in the streams. It applies that to large or small

Q Then he is not a very reliable man upon that subject? A I cannot say whether he is or not. That is a difference of opinion between scientific persons.

Q You do not know then whether when you say the variation is between 1.16 and 1.31, whether it would have been fair to estimate that with 1.26 as a coefficient?

A There would be no absolute certainty in a

matter of that kind

Q Well I say your examination does not tell you which is right or whether either right or whether 1.26 for all sizes of streams would be a fair coefficient to you?

Ans Sir I could not determine that without a long series of experiments perhaps covering several years

Q Well if 1.16 was for one stream and 1.31 for another stream wouldn't it be patent that 1.26 for all streams would lead to very gross errors?

Ans it would not, because the difference between 1.26 and 1.16 is only a small per centage It is less than 10 per cent

Q I should count it just 10 as I make it; it looks to me just like one tenth - no I suppose

I was looking at my figures wrong — you spoke of a miners inch of water being how many feet — cubic feet

A amounting to 2230 cubic feet in 24 hours

Q 2230 ; how did you determine that?

A That has been accepted through the mining regions by many of the miners as a proper quantity for a miners' inch

Q That is accepted by miners? A Yes sir

Q Well now, do you mean to say that you, as an Engineer accept and give here in evidence a quantity of feet or the quantity of gallons for 24 hours on the estimate which a miner puts upon it? A Expert miners

Q Not miners, but experts

A Yes sir

Q You never have made the ^{estimate} experiment, yourself?

A I have

Q You have made the estimate yourself? A Yes sir

Q Did you verify it?

A Yes sir I have. I have made the estimate

Q Did you verify it?

Was this verified? That is that it was 2230 cubic feet?

A Very closely? A Yes sir

Q How many gallons did you give? A 16000

Q 16000 gallons? Now you are sure ^{that is} what you mean, that one inch of water would be 16000 gallons?

A Very nearly. It is not an exact quantity, a miner's inch, but it must be assumed at something and 16000 gallons is generally accepted as the miner's inch. I have the authority of Mr Starnilton Smith on

that myself

Q Now you say you have verified this 2230? I will ask you how you verified it

A By finding how much water will be discharged through an orifice one inch square under given pressure by the usual formula. I have done that several times

Q By the usual formula?

A The usual formula in the books - bydraulic formulas.

Q Will you name the formula? A I do not recall the formula now

Q Is that a simple formula? A It is not very complex

Q It is a simple equation is it not? A A simple equation. It is a simple equation with a coefficient I do not remember what the coefficient was.

Q You have a coefficient with the one you have given here? A I make the calculation and I put it down and I do not think anything more about the formula. I can always refer to that when ever I want it

Q Will you give the formula, omitting the coefficient? A I do not remember it. It depends upon the square root of the height. I can state the formula that the discharge is as the coefficient multiplied by the area of the orifice and by the square root of the height but what the coefficient is I do not remember. I can ^{not} remember all these figures

Q Now you stated in your direct examination that you had sometime made a survey of

Bear River and the Cosumnes River and also the Yuba River and also some portion of the Feather River. A I stated that I had made a survey of the Yuba River ^{and} ~~its~~ its forks and a reconnaissance of the other rivers, I did not survey the other rivers. I made a reconnaissance and inspected them but the Yuba I surveyed in connection with the State Engineer's department.

Q But you did make a survey of the Bear River?

A No sir, not of the ~~Bear~~ ^{Bear} River.

Q You were a witness in the case? A I was.

Q Did you testify there as to the quantity of pediment annually passing the railroad bridge near Wheatland?

A I remember that I

did

Q Do you remember the quantity that you stated there in cubic yards?

A I cannot say that I do; it is a matter of record, I have measured a great many since.

< Objected to as not cross examination >

Q These other surveys that you have spoken of were also made under the employment of Mr Ludwalaader — the Bear River and Yuba and Feather? A They were. He directed me to make them though I was paid by other parties, I never was paid by Mr Ludwalaader for my services

Q By whom paid?

A I was paid through Mr Seely of Marysville the Treasurer I believe of the Anti-debris Association

Q Have you been more or less continuously employed by the same parties for the last three years?

A Not continuously but whenever they desired an examination of that kind I was employed

Q And in making your examination here you confine yourself strictly to the North fork?

A To the North fork

Q Well did you mean to have it understood from your testimony that the material which you found in the American river below Folsom came principally or entirely from the North fork? A I did not say

Q Did you mean to make any approximation at all to the quantity of material which was found here coming from that river and coming

from the other forks of the river? A I have made such an approximation but I was not allowed to state it in my direct examination

Q What is the grade of the American from the junction of the North and South forks to the States Prison Ravine, very nearly two thirds of the distance from the junction of the South fork to the bridge at Folsom? A I cannot

say

Q Not even approximately? A I did not take time - no I could not approximate. I know it is a rapid stream, that is all

Q That you only saw from the heights?

A And also at the river at different points, I was also at the junction

I was at the junction of the South fork right at the river, right in the river

Q But you could not pay at all as to the grade? A I could not no sir, that would be a matter of instrumental measurement

Q You say that grade is a matter of instrumental measurement? A In this case it would have to be ascertained instrumentally to be able to state what the grade was

Q Is the grade an even grade for the distance I have spoken of?

A I think not. There were a great many forges or rocks in it - rapids

Q Could not you have measured grades there as well as any where else on the river?
A Yes sir if I had

taken the observation on the aneroid I could, but I ^{did} ~~could~~ not do so

Q Will an aneroid determine grades?

A An aneroid will determine the fall of a river between long distances, not short distances but long distances and you could average it

Q Then approximately
 A We find by the aneroid the altitude of one point in the river and then perhaps 20 miles below we find the altitude again and then dividing it by the distance will give the average grade for that distance of the river

Q Is there any reliance to be placed upon the determination by aneroid?

A Yes sir, very considerable under a great many circumstances

Q That is when you can't do anything better

A An aneroid at times is a very accurate instrument, sometimes it is inaccurate, depending upon the weather, the fluctuations in the weather - corrections have to be made from day to day

Q Do you mean to say that an aneroid barometer is any fair approximation to correctness compared to a mercurial barometer?

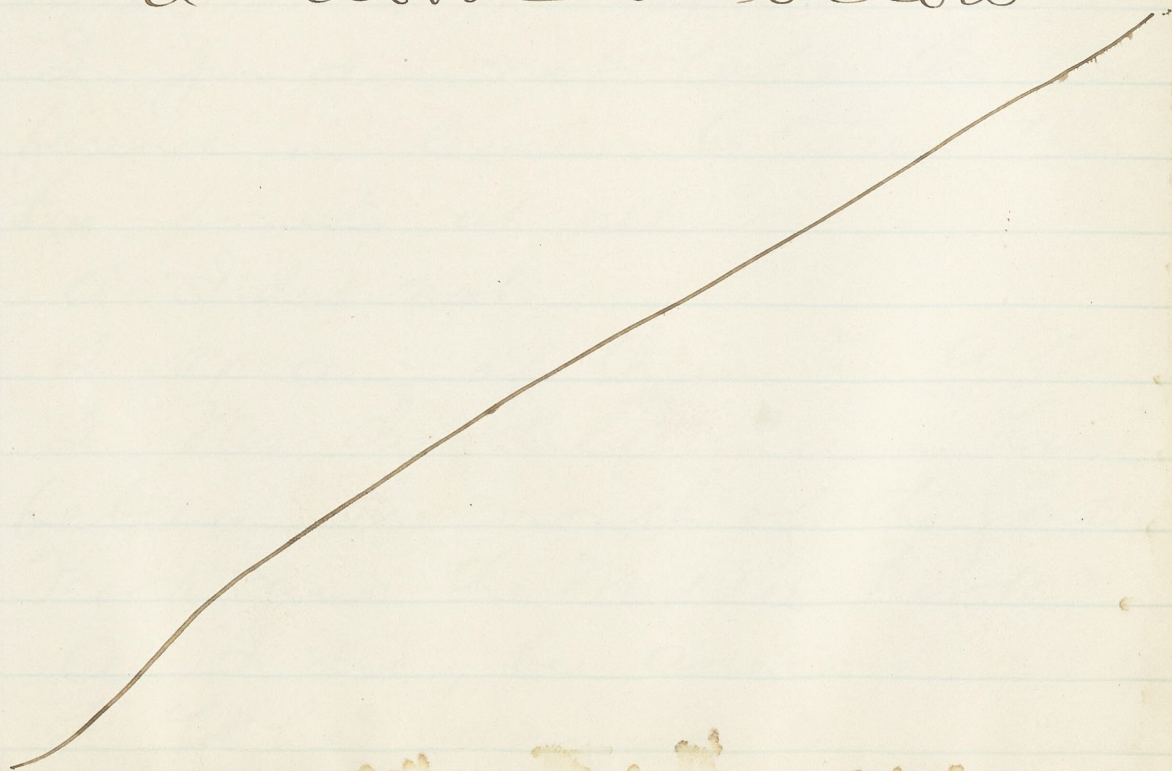
A I think it is fully as accurate as a mercurial barometer because it is operated upon by the same principles, ~~that~~ a mercurial barometer is always inaccurate

Q They are ~~little~~ inaccurate when tested by any proper instrument by measurement?

A They are inae-
curate when there
is a change in
the weather. At
the same time an
aneroid or mercurial
barometer will show
differences of 20 or
30 feet.

Q Did you take the
grade for the dis-
tance between the
State Prison and
the reach of smooth
water ahead of
that?

A Above or below



A Above or Below

Q. I ask you if you took at all, or made any estimate of the grade of the river from State Prison Ravine down to the head of smooth water above the bridge?

A. No, I did not. I made no estimation, no observations on that point.

Q. Was there a reach of still water above the bridge?

A. There is.

Q. About how long?

A. Quite a distance. Perhaps quarter of a mile. It might be more; I do not remember exactly. It is not absolutely still, it is a very slow current.

Q. You did not take the difference in levels between those two points at all?

A. I did not.

Q. Or any of them? A. No.

Q. Nor the difference in level between the mouth of the South Fork and the Middle Fork?

A. I did, by aneroid

Q. What was it?

A. I do not remember the figure. But it was such a figure as to give an average grade I think of 19 feet to the mile.

Q. What were the figures?

A. I do not remember. I remember the resulting grade as nineteen feet to the mile.

Q. But you do not remember about the figures?

A. I can easily ascertain about the figures by multiplying the distance.

Q. Have you got the figures in your book? A. I can find them on the map I think.

Q. What? The feet, or the barometrical measurement?

A. The barometrical measurement.

Q. Now I ask you if you have a minute in your ^{memoranda} of the figures which you took from the barometer?

A. Oh yes.

Q. What is it? Have you your book with you?

A I have

2. Take it out and let us see what it was between the South Fork and Middle Fork. What was the reading of the barometer at the Middle Fork.

A {Examining book}. 5700 feet at Lyons wire bridge. The altitude at Lyons wire bridge which is at the mouth of the Middle Fork is 500 feet, and the bridge was 57 feet above the water. That would leave 51 or say 50 feet to be deducted. From hundred and sixty we can say the altitude of the barometer on the river at Lyons wire bridge. That was the altitude marked on the barometer.

2. Is the altitude marked on the barometer?

A You can read it, on it

2. I am asking you just the reading of the barometer, not your deductions?

A I do not quite understand that question

Q. What did your barometer show? You took that out and looked at it. Now what did your barometer in itself show?

A. It gives the reading above sea level.

Q. The altitude is marked on the barometer?

A. Yes, there is an index and it is graduated and you can read it off, just as you can see to read the time of day, or the angles of a degree.

Q. How do you say?

A. Just as you would read the angles on a graduated circle. It is very distinct.

Q. Then at the other point, the South Fork?

A. I find my reading at the South Fork, no, not at the South Fork; I have not it so accurate there as at the Folsom bridge.

Q. Two or three miles below?

A. Yes. There it was, I think 150 feet, on the bridge. I will see in a moment (Examining book)

100 feet on the bridge and the bridge was 40 or 45 feet above the surface of the water. No, it was over 45 feet above the water. That would give it about 100 feet altitude.

Q. You took no observations at the fifth Fork or near it? A. No, I have none down

Q. Where is Lyons bridge situated in relation to the mouth of the Middle Fork?

A. It is about 100 yards below the mouth of the Middle Fork.

Q. These were the only two observations that you took with the barometer, from the mouth of the Middle Fork down to Hobson? A. No, I took an observation at Carrollton. I have that marked here on the map 340 feet.

Q. How did you carry your barometer? A. In my pocket, my vest pocket, like a watch

Q. You had a very small one then?
 A. It was the usual size of an aneroid barometer. It is about three inches in diameter, it was a larger size; they have them much smaller; they have them as small as a small watch.

Re-direct Examination
 G. F. Allardt.

Mr. Cadwalader. I want to ask you whether the term Chemical Analysis is not frequently used with reference to the analysis of soil?

A. It seems to me I have frequently read it. It is a very familiar term to me, but I can not tell where I saw it. I think it is a word that explains itself.

Q. I will ask you whether your Experiment in getting at that average flow of sediment

in the tail fence of the Gold
Run Company would be apt
to cause more or less sand —

Mr. Belcher (Intg) We make
the objection that the counsel
has already been through this
Examination

Mr. Cadwalader I want to know
whether it is a fair Exami-
nation

Mr. Belcher. I make the ob-
jection and we have cross-
Examined as to it

The Court That is so
Mr. Cadwalader. I will ask
you in regard to the measure-
ment of distances, to what
extent you are familiar with
measurements? That is by
the eye

Mr. Belcher. We make the
objection again, that even if
this were matter that were
proper for Examination here,
we have already been over
it on both sides

Mr. Cadwalader I have not touch-
ed on it

The Court You can ask the witness his Experience as to measurement.

The Witness. It is something I have practiced all my professional lifetime more or less. It is necessary frequently to use the Eye in approximating distances. There are many other ways of approximating distances, when you have no ^{measuring} measurement tools with you as by walking, timing, compassing and so on.

2. Were not all your views when you were not in the bed of the river, what are called birds-eye views

Mr Belcher. We object to the question as leading

The Court. He has stated from what points he took his views. It is immaterial whether he calls them Birds-Eye views or what he calls them.

3631 Mr. Cadwalader. Mr. Belcher asks you whether you made

any estimate of the extent of mining at any place excepting Gold Run. I will ask you whether your answer included Iowa Hill.

A. In my direct examination I spoke of Iowa Hill and gave an estimate of the amount of mining there from actual inspection.

Q. You told Mr. Deleher that you went from Iowa Hill up the divide, and then across the river to Gold Run. Where did you cross the river? A. I crossed over the river at Fords bar, or Fords bridge - which is it (Examining map). I crossed the river at a place called Fords bridge. It is marked Fords bridge on the map. There is no bridge there now and there was not at that time.

Q. In going down that trail, what kind of views did you have of the river about Canon Creek?

A. I had an Excellent view at different times; Could see it for a long distance. I could not see every part of it but I could see the character of the river.

2. Mr. Belcher asked you something in regard to the number of examinations that you had made of these different rivers and the times apart. Just state the difference in the times during which you made an examination of these different rivers.

A. I examined Bear River in 1878, partially in 1879; in 1879 the Yabias ^{and} in 1880; I do not remember whether it was ^{out} in the field in 1880 or not; In 1881 I examined the Healer and the North Fork of the American, the Bear again partially and the Cosumnes.

— " —

Testimony of Dwight I. Huntley

Called for Plaintiff sworn

Mr. Cadwalader. State where you reside?

A. I reside in Oakland

Q. State what business, occupation or profession you follow?

A. I am a Metallurgist

Q. What experience have you had in reference to mines and mining matters?

A. I graduated from the University of California in 1895, and while there took a mining course. Since that time I have been studying or working in the mine. One year after I was studying in Professor Huntley's office in San Francisco. For two years I was at a mine in Nevada, assaying, milling and smelting. For a year after that

I was at the University of California taking a post graduate course - For six months I was in Arizona at a mill. For seven months I was in Utah collecting statistics of mines and mining for the U. S. Census. From Utah I went into Wyoming, into Nye County and Esmeralda County Nevada, and Inyo, Mono, Shasta, and Trinity Counties California, also collecting statistics.

2 What kind of statistics

A. Statistics in regard to the production of precious metals, labor employed, and Capital Employed, mechanical construction of mills, smelters and so forth; anything that I thought would be of interest to the reading public. And in writing up my report on that subject I have been at Oakland, and was asked by Mr. Allard to accompany him to Gooskin

a few weeks ago

Q. Had you visited hydraulic mines? A. Yes, I lived in Grass Valley sixteen years as a boy, and am somewhat familiar with them. I have passed any stage through that country adjacent to Nevada, in Nevada County. I have ridden considerably, as it was a part of my business, in Shasta and Trinity Counties and visited all these mines and inquired of the owners and superintendents regarding them, the profits, labor employed, grade of sluices, size of pipe and so forth.

Q. What time did you start with Mr. Allardt?

A. We left Sacramento on the 31st of October or the 30th of October.

Q. When did you return?

A. On the 7th of November

Q. Where were you during that time? A. We travelled

in the river, in the American
river and the North Fork of
the American River and along
the banks between Nolan and
Gold Run ?

Q What time were you at
the Gold Run mine ?

A I think it was Nov. 5th

Q It was during that in-
terval ? A Yes

Q Who did you see there ?

A I saw Mr. Jones, Mr. Grusky,
General Cosby, Mr. Allardt
and Mr. Pearson

Q What was Grusky doing ?

A Grusky was making
a survey in order to determine
the quantity -

Mr. Belcher (Int^y) No matter
what he was determining
Mr. Cadwalader. Making a
survey of what ?

A - Of the pit which is
worked by the Gold Run
Ditch and Mining Company

Q Did you see that pit ?

A I did

Q Did you see the size of the

Banks? A. I did
 2 How high do they ap-
 pear to be? A. It is
 a very irregular pit, the
 banks vary greatly in height.
 The banks varied greatly in
 height from 50 to 150 feet
 perhaps.

2 What would be the average
 A. 120 feet perhaps

2. What was the character
 of that bank where the stuff
 is being worked there?

A The banks surrounding that
 pit, would be called by miners
 gravel. It is composed of
 pebbles and cobbles and sand
 and clay, the color is a
 light greenish blue. There
 are no spots in it but
 the general color is light green-
 ish blue. There are in the
 gravel irregular masses of
 sand, having a lenticular
 shape. The thickness of them
 will vary from a few inches
 to three or four feet. The
 gravel itself contains con-

Considerable gravel and clay,
 In looking at the bank you
 see some cobbles sticking out.
 In general the size of the lay-
 est cobbles in the bank, is
 not larger than half the size
 of a man's head. There are
 a great many smaller pebbles.
 The clay some of it is in with
 the pebbles and sand, but in
 general the clay lies in two
 strata. On the East side of
 the pit it is 6 to 10 feet
 thick. It is of a light greenish
 color. It contains scales of
 mica. This clay is called
 pipe clay by the miners. When
 it is first exposed it is very
 tough. When it has been expo-
 sed to the air for two or three
 months it commences to slack,
 and some part may even
 crumble and wash away
 very readily. It usually comes
 down in large blocks, judging
 from what I saw

2 What proportion of the
 different materials did

This bank contains.

A surveying the whole
mass I showed ridge
that about half of it
about one half of the
material seen on the
banks would be pebbles
and cobbles larger
than a pea. The re-
maining half would be
fine

Mr. Belcher Did you
say fine or fine?
A: Fine.

Mr. Adwalades Did you make any estimate of what is called pay in that earth per cubic yard? A I do not understand the question

Q Did you make any estimate of what is called the pay, the gold in that stuff per cubic yard?

A No I have not myself made any estimate except from general reading in scientific books. I believe

Mr. Beecher (intd) You need not state the result of that

Mr. Adwalades One moment. It has the value of what has been estimated by any geologist of this Country of established reputation? A It has;

by J. W. Whitney, State Geologist of California

Q What is below the body of deep gravel in the channel down to bed rock?

A The bottom gravel

which is of this bluish, greenish color

Q What is the top earth, there? A The top earth there is with the exception of the few top feet of a bluish color. It is of a red color instead of a blue color, a reddish color that is due to the oxidation of the iron contained in the lower portions of the gravel bank. Whenever the percolating rain waters which contain air dissolved in them have not penetrated or even if they have penetrated and been deprived of the air, the lower portions of the gravel are not stained red, for to protoxide of iron there has not been acted upon. Where the water has penetrated containing this air it has oxidized from the protoxide to the Sesqui-oxide condition the

iron contained in this clay and given it the characteristic color of sesqui-oxide of iron; brown to red

Q How wide is this channel that the Gold Run is working?

A I did not measure it. I should estimate it to be 300 feet wide. I believe I was told it was that too

Q By whom?

Mr Becher No matter by whom. He has said that he was told and I take it that would not be competent - what he was told

Mr Badwalader Suppose the Superintendent, the man working the mine paid so.

The Court I shall not admit it.

Mr Badwalader What is the length of this pit

in the fold Run and
its average depth?

That pit is very
irregular. Any person
giving an estimate of
the length of it might be
troubled to go there a
year afterwards and
give the same length.
One could only give an
estimate of the general
size; perhaps, averaging
a little space off here
and another one off there
to fill up and make
a block. I estimated
simply by the eye; I
did not go there to make
any accurate survey.
I estimated that the
length of the pit was
800 feet, the width
300 and the depth
120 feet, filling in the
corners and taking out
the corners to make a
block of that shape.

Q Did you see the

banks on which they
had been piping?

a I did

Q Was there much
gravel left yet to pipe
off? A There is a
great deal of gravel left
to pipe off between that
pit and the north fork
of the North American
river, and an unknown
amount — I do not know
where the channel goes —
going northerly

Q How deep did you
find the ~~poils~~ ⁱⁿ some
places on these banks?

a Those irregular
masses of sand, lenticular
deposits, were 3 to 4 feet
thick or deep

Q Would that be the
maximum? a I think
that would be the max
imum

Q What would be the
minimum? a A few
inches

Q What is the depth of this pipe clay?

A There are two strata they vary at different places where they are exposed to 10 feet thickness each of them

Q And what did you say about mica being so apparent?

A In that pipe clay one can see mica. It has been deposited when the clay was deposited and we see it now when we break the pieces.

Q Did you see any signs of stratification in the banks? A Yes. The pipe clay is in strata. There is no extended stratification apparently. That is one could not look around the whole pit and see a line that would be a strata above or below it. But

there would be lenticular deposits at one time and then another one or two adjoining on to that, lapping like that <showing> tonguing in together and so the banks of the pit are made up.

Q Now in regard to the manner of cleanness in which this mine has been worked off from side to side in the channel?

A I do not understand the question

Q What has been the manner of the working of this mine in regard to cleanness of the work done?

A In the bottom of the pit it is very clean. There are comparatively few mines that I have seen in Trinity County that showed such a clean

bed rock. The bottom of the pit is very clean. On the Eastern side, near the pipe clay, there are some large boulders, but there it is evident it has not been cleaned off.

Q Did you notice whether this mine was equipped? A Yes. There were three lines of pipe I think and four giants. I believe, I know three of them were in position; I do not remember whether the fourth was attached or not.

Q Now then, in regard to night work

A I did not see anything that would indicate night work. I heard something.

Q In what direction has this stuff been washed out of this pit?

A It has been washed

to some cuts in the bed rock and through those cuts to the tunnel which empties into Canon Creek

Q How in regard to the manner in which this material is cemented together? A The banks are not very loose and crumbly. They have been slightly cemented together. In the northern portion on the bed rock there seemed to be a body of quite hard cement.

The cementing material is clay and silica and the oxide of iron. The silica has undoubtedly come from — those are the generally accepted theories at least that the silica has come from —

Mr Belcher Q Are you stating what some one else has theorized or what you know about it?

I wish you ^{would} give us what
you know without any the-
ories at present

Mr. Adalades It will
be sufficient for him to
state at present that he
find in silicious

The Witness I know that
the cement is silicious
for I know I have seen
petrified wood, silicified
wood in the pit, which
is a proof that some of
the cement is silicious

Q You say on the bed
rock near the northern
end of the pit there was
a body of very hard cement

A Yes it seemed as if
it had been very hard
cement. It was somewhat
loose of course, having laid
exposed for some months
at the time of our visit. I
judged it to be very
hard because it had
been left

Q Been what? A Sept.

had not been washed off
as they worked around

Q How did it compare
with the general bank?

A The general bank and
the lower pit was at the
south end and I think it
was somewhat softer
than this. I judge it to
have been somewhat softer
because although the
bank was nearly vertical
there was a large amount
of debris that had crumbled
or fallen off — fine material
— and filled up a
large angle at its base

Q What is the size of
that tunnel? A It
varies somewhat from
7 feet to 9 feet sometimes
more in height and
12 feet wide to 10 feet
wide

Q What is the size of
the flume in it?

A $5\frac{1}{2}$ feet wide and
 $2\frac{1}{2}$ feet deep

Q Is it any drops in it?

A There are two drops I believe, perhaps three

Q Did you go through that tunnel? A I did

Q Who went with you? A Mr Pierson.

Q I believe you say the flume empties into Canon Creek? A Yes sir

Q What is the distance from there to the mouth of Canon Creek? A About 1 mile

Q Who went down with you? A Mr Allardt, Mr Pierson and General Cosby

Q What is the fall of that Cañon from there to the mouth?

A 1020 feet

Q State how much if any debris has lodged in it below the mouth of the tunnel?

A There is very little indeed. It is a very fine

preyious gorge and there are very few places where any debris can lodge

④ State what in the way of lodgments of debris you found in the bed of the American river opposite Cañon Creek?

A There was no lodgment of debris opposite Cañon Creek more than would be found in the bed of the river on the way down, having its regular grade. The water had swept over it levelling down the debris which had been poured into it

Q What was the condition of the river as to debris immediately above Canon Creek? A The debris had flowed back 100 feet or more up stream and therefore there were some cobbles in that portion, but above that

the river was clear.
 The bed of the river looked
 entirely different above
 Canon Creek. There were
 no pebbles of the kind
 which come from this
 mine but on the contrary
 they were of a different
 color and of a much
 larger kind. A few
 smaller ones but in
 general they were quite
 large.

Q What did the condition
 of the river bed indicate
 towards or at the mouth
 of Canon Creek?

A That there had been
 no mining debris put in
 the river above that I
 should judge.

Q What was the condition
 of the water above and
 below? A It was clear,
 perfectly clear above the
 mouth of Canon Creek.
 There was a small amount
 of water coming through

the tunnel or one branch
of the tunnel which was
muddy which poured
into the North fork at
the mouth of Cañon Creek

Q How much of a
stream of this muddy
water was there there?

A 10 or 20 inches. And
that gave the general
stream in the North fork
a milky appearance

Q How wide is the North
fork above the mouth of
Cañon Creek, about?

A About 75 to 100 feet wide

Q Did you go down the
river below the mouth
of Cañon Creek about
half a mile below Rice's
bridge

Mr Belcher See him
state where he went

Mr Goodwalder This is
simply a preliminary
question

Mr Belcher You have too
many preliminary questions

A Yes I went down

Q Without saying any thing more about that who went with you?

A Allardt Jenkinsky and General Cosby

Q In going down how did you go and where did you travel?

A We could not go down Canon Creek to get into the river, we had to go down a trail which entered the North fork several miles below and then rode up to the mouth of Canon Creek and then back again

Q How did you go down?

A We went down a trail

Q Where was the trail?

A The trail leads from Gold Run

Q But where was the trail with reference to the bed of the river?

A The trail that we went down was down a

ridge which was several hundred feet a thousand feet perhaps, perhaps more than a thousand feet above the bed of the river.

Q That is not what I want to get at but whether you went down the bed of the river?

A We rode down the bed of the river from the mouth of Canon Creek to a short distance, half a mile perhaps below Rice's bridge.

Q That is what I want to get at. These gentlemen were all with you were they? A They were those three that I mentioned.

Q What is the distance.

A Nine miles; nine miles from the mouth of Canon Creek.

Mr Belcher That is indicated on the map?

A Yes sir.

Mr Leadwelder What else?

A I did not charge my mind with remembering the time or distance. We had the map along with us.

Mr Becher Stud this map? Ayes.

Mr Badwalader & Now what was your object in going down there?

A It was to see the nature of the material in the bed of the river, and also to see that there were no obstructions to the flow of water in the river.

Q What was the character of the river and its bed?

A The river varies in width from 100 to 300 feet in that section; the sides are very steep, from 30 to 40 degrees slope probably. The ridges rose 1000 feet or more above the bed of the river. The material

in the bed of the river
 looked very similar to
 that sand in the mine
 with the exception that
 there was a little less
 sand and no clay
 in the bed of the river. I
 do not mean there was
 absolutely no clay that
 could be washed out
 of some of that material
 lodged there. But we
 saw no strata of clay
 or slickens. And there
 seemed to be not such a
 large proportion of sand
 the cobbles seemed to be of
 about the same size as
 Rice's bridge as they did
 at the mouth of Canon
 Creek and I do not think
 a person could tell the
 difference between the
 materials. There were
 pebbles of white quartz,
 of slate the same as
 seen in the pit

© How as to bars in that

section of the river:

A The river bed I said was about 100 to 300 feet wide. The stream itself did not occupy that entire bed.

Q How much did the stream occupy?

A It was 25 to 60 feet wide. The rest of the bed was sand and gravel.

Q How was the river bed as to holes or evenness or unevenness of grade?

A There were no holes. It seemed as if the river bed had almost a railroad grade. It was so even, so true. One could stand and look up or down the river for a mile or half a mile depending on where he was and see it almost a true line that the river had graded.

Q Did you find any rapids or falls?

A There were slight ripples
but no rapids and no
falls

< Recess until 2 p.m. >

